

Yellow-headed blackbird
©Barbara Wheeler



Chapter 1 Introduction and Background

Chapter 1
Introduction and
Background

Chapter 2
Management
Direction

Chapter 3
Physical
Environment

Chapter 4
Biological
Environment

Chapter 5
Human
Environment

Maps

Appendices

1.1 Introduction

The sedges were full of birds, the waters were full of birds: avocets, stilts, willets, killdeers, coots, phalaropes, rails, tule wrens, yellow-headed black birds, black terns, Forster's terns, Caspian terns, pintail, mallard, cinnamon teal, canvas-back, redhead and ruddy ducks, Canada geese, night herons, great blue herons, Farallon cormorants, great white pelicans, great glossy ibises, California gulls, eared grebes, Western grebes—clouds of them, acres of them, square miles—one hundred and forty-three square miles of them!

—Dallas Lore Sharp [1914] remarking on Lake Malheur Bird Reservation

In the late 1880s, plume hunters decimated North American bird populations in pursuit of breeding feathers for the hat industry. Hunters targeted large flocks of colonial nesting birds and shorebirds, killing birds indiscriminately and orphaning chicks. Eventually, the large numbers of colonial nesting birds on Malheur Lake were discovered by plume hunters. In 1908, wildlife photographers William L. Finley and Herman T. Bohlman discovered that most of the white herons (egrets) on Malheur Lake had been killed in 1898 by plume hunters. After 10 years the white heron population still had not recovered. With backing from the Oregon Audubon Society, Finley and Bohlman proposed establishment of a bird reservation to protect birds using Malheur, Mud, and Harney lakes.

Government lands identified as the Lake Malheur Reservation were set aside on August 18, 1908, by President Theodore Roosevelt using Executive Order No. 929 “as a preserve and breeding ground for native birds.” An August 12, 1908 letter to the President from the Secretary of the Interior stated that the purpose and intent was “to preserve the habitat values of the three lakes (Malheur, Mud and Harney Lakes) for migratory waterfowl, and especially, the colonial nesting species.”

Decisions made today for refuge management will have far-reaching consequences for the hundreds of species dependent on refuge habitats, as well as for current and future Harney County residents and refuge visitors. This document is a plan for the next 15 years. Planning is a means to an end, and that end is good decisions. We have attempted to think through the critical resources and public use issues carefully, to design a plan that will meet the conservation and recreation challenges of the coming years.

1.2 The Significance of Malheur National Wildlife Refuge

Malheur National Wildlife Refuge (Malheur Refuge, or the Refuge) is situated within the Harney Basin in southeastern Oregon (Map 1). Located in the Northern Great Basin, this portion of the State is lightly populated, generally arid with cold winters, and characterized by wide open spaces.

The Refuge, measuring 187,757 acres, constitutes a small percentage of the Northern Great Basin's total acreage but is a tremendously important source of wildlife habitat relative to other portions of the Northern Great Basin. The Refuge represents a crucial stop along the Pacific Flyway and offers resting, breeding, and nesting habitat for hundreds of migratory birds and other wildlife. Many of the species migrating through or breeding here are highlighted as priority species in national bird conservation plans.

Historical bird counts show that the Refuge and the Silvies River floodplain just north of the Refuge may support anywhere between 5 and 66 percent of the Pacific Flyway's migrating populations for various priority waterfowl. On the Refuge, breeding habitat is significant for waterbirds, with the Refuge currently supporting over 20 percent of the Oregon population of breeding greater sandhill cranes (*Grus canadensis tabida*). Most colonial waterbird numbers have easily exceeded 10 percent of the regional population at peak, even reaching up to 77 percent of the Great Basin population for certain species. Numbers of migrating shorebirds have been documented at levels high enough to qualify the Refuge as a Regional Western Hemispheric Shorebird Reserve. The Refuge also supports very high densities of certain nesting riparian passerines and the largest local population of bobolinks (*Dolichonyx oryzivorus*) in the western U.S.

In addition to these biological values, the Refuge is well-loved by its visitors, many of whom return year after year. The Refuge is cherished for its excellent birding, the opportunity to find solitude in a remote, open landscape, its many historic remnants and geologic sites of interest, and its proximity to an Oregon landmark, Steens Mountain. The Refuge has strong historic ties to local residents as an important contributor to local economies. Far-flung communities of birders also feel a strong connection to the Refuge, with awareness that the Audubon Society played a pivotal role in its initial establishment. Both local and distant communities will continue to play a large role in the Refuge's future.

Challenges for maintaining and enhancing these biological and social values are explored below. Further information regarding the area's physical environment, biological resources, and public use patterns are found in Chapters 3, 4, and 5 of this document.

1.3 Action

The U.S. Fish and Wildlife Service (USFWS or the Service) is adopting and implementing a comprehensive conservation plan for Malheur National Wildlife Refuge, located in the Northern Great Basin of southeast Oregon in Harney County. This document is a comprehensive conservation plan (CCP) for the Refuge. The CCP sets forth management guidance for the Refuge over the next 15 years, as required by the National Wildlife Refuge System Administration Act of 1966 ([16 U.S.C. 668dd-668ee](#)) as amended by the National Wildlife Refuge System Improvement Act of 1997). The Improvement Act ([P.L. 105-57](#)) mandated that CCPs be developed for all refuges in the National Wildlife Refuge System.

The management direction described in Chapter 2 will best achieve the purpose and need for the CCP while maintaining a balance among the varied management needs and programs. It addresses the issues and relevant mandates and is consistent with principles of sound fish and wildlife management.

The management direction was modified between the draft and final documents based on comments received from the public or other agencies and organizations. The Regional Director for the Service's Pacific Region decided which alternative will be adopted for implementation. For details on the management direction, see Chapter 2.

1.4 Purpose and Need for Action

The purpose of the CCP is to provide consistent, reasonable, scientifically grounded guidance. This guidance will ensure that, over the next 15 years, the Refuge will:

- protect, maintain, and enhance lake, in-stream, riparian, marsh, meadow, and upland (sagebrush steppe, basin big sagebrush islands, salt desert scrub) habitats, for the benefit of migratory and breeding birds and a diverse assemblage of other native species;
- protect and maintain rare, unique, and special habitats at Malheur Refuge, including cliffs, rimrock, lava flows, cold and hot springs, dunes, and playas for the benefit of migratory and breeding birds and a diverse assemblage of other native species;
- contribute to the conservation, protection, and recovery of rare species, including any federally listed or candidate species, State sensitive species, and other priority species (Appendix E);
- provide compatible wildlife-dependent recreation opportunities for visitors, fostering an appreciation and understanding of the Refuge's fish, wildlife, plants, and their habitats;
- adequately inventory, protect, restore, and interpret the Refuge's unique cultural, historical, and paleontological resources;
- gather scientific information to contribute to better decision making and monitor environmental change; and
- actively engage in off-refuge collaborative conservation efforts.

The CCP is needed for a variety of reasons. These reasons consist of the need to:

- review the contribution of the Refuge to Flyway and landscape goals for migratory and breeding birds and other priority species, to assess current management strategies in light of these goals, and to recommend appropriate actions to ensure that the Refuge will provide the quantity and quality of habitats necessary for meeting these goals;
- review the Refuge's water system operations and infrastructure in relation to all habitats and identify needs related to providing water for priority species;
- maintain a consistent management plan and direction regardless of refuge staff changes;
- effectively address the problem of the spread and expansion of invasive species, such as carp and perennial pepperweed, across a wide range of habitats;
- improve degraded habitat conditions;
- properly prescribe the use of tools such as haying, grazing, crop cultivation, and burning in the creation and maintenance of desired habitat conditions;
- ensure that neither refuge management activities, including habitat management and administrative activities, nor public uses result in damage or loss of irretrievable cultural and paleontological resources;
- assist in cultivating strong relationships with partners such as the Burns Paiute Tribe, other governments, refuge neighbors, and various nongovernmental organizations;
- determine what improvements or alterations should be made in the "Big Six" Refuge System wildlife-dependent uses (wildlife observation, wildlife/nature photography, environmental education, interpretation, hunting, and fishing) or other programs and services offered to refuge visitors; and
- increase the energy efficiency and sustainability of refuge operations.

1.5 Legal and Policy Guidance

The Refuge is managed as part of the National Wildlife Refuge System and must adhere to various legal and policy guidelines. In developing a CCP, the planning team considers the various laws, regulations, agency missions and policies, and ecosystem goals, together with the Refuge's purpose and refuge-specific issues and goals. The broader mandates that apply to each refuge are explained and described in this section.

1.5.1 The U.S. Fish and Wildlife Service

All refuges are managed by the U.S. Fish and Wildlife Service, an agency within the Department of Interior. The Service is the principal Federal agency responsible for conserving, protecting, and enhancing fish, wildlife and plants and their habitats for the continuing benefit of the American people.

U.S. Fish and Wildlife Service Mission: The mission of the U.S. Fish and Wildlife Service is “working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.” National natural resources entrusted to the Service for conservation and protection include migratory birds, endangered and threatened species, interjurisdictional fish, wetlands, and certain marine mammals. The Service also manages national fish hatcheries, enforces Federal wildlife laws and international treaties on importing and exporting wildlife, assists with state fish and wildlife programs, and helps other countries develop wildlife conservation programs.

1.5.2 National Wildlife Refuge System

The 150-million-acre National Wildlife Refuge System (Refuge System, NWRS) encompasses 551 National Wildlife Refuges, thousands of small wetlands and other special management areas. The Refuge System is the world's largest network of public lands and waters set aside specifically for conserving wildlife and protecting ecosystems. From its inception in 1903, the Refuge System has grown to encompass refuges in all 50 states and waterfowl production areas in 10 states. More than 36 million visitors annually fish, hunt, observe and photograph wildlife, or participate in environmental education and interpretive activities on National Wildlife Refuges.

The needs of wildlife and their habitats come first on refuges, in contrast to other public lands that are managed for multiple uses. Refuges are guided by various Federal laws and executive orders, Service policies, and international treaties. Fundamental are the mission and goals of the Refuge System and the designated purposes of the refuge unit as described in establishing legislation, executive orders, or other documents establishing, authorizing, or expanding a refuge.

National Wildlife Refuge System Mission and Goals: The mission of the Refuge System is “to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” ([16 U.S.C. 668dd-668ee](#), as amended).

The goals of the National Wildlife Refuge System, as articulated in the Mission, Goals, and Purposes Policy ([601 FW 1](#)) are to

- conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered;
- develop and maintain a network of habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations that is strategically distributed and carefully managed to meet important life-history needs of these species across their ranges;
- conserve those ecosystems, plant communities, wetlands of national or international significance and landscapes and seascapes that are unique, rare, declining, or underrepresented in existing protection efforts;
- provide and enhance opportunities to participate in compatible wildlife-dependent recreation (hunting, fishing, wildlife observation and photography, and environmental education and interpretation); and
- foster understanding and instill appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.

National Wildlife Refuge System Administration Act: Key concepts and guidance of the Refuge System derive from the National Wildlife Refuge System Administration Act of 1966 as amended ([16 U.S.C. 668dd-668ee](#)). Of all the laws governing activities on National Wildlife Refuges, the Refuge Administration Act undoubtedly exerts the greatest influence. The National Wildlife Refuge System Improvement Act (Improvement Act; [P.L. 105-57](#)) amended the Refuge System Administration Act in 1997 by including a unifying mission for all National Wildlife Refuges as a system, a new process for determining compatible uses on refuges, and a requirement that each refuge will be managed under a CCP, to be developed in an open public process.

The Refuge Administration Act states that the Secretary of the Interior shall provide for the conservation of fish, wildlife and plants, and their habitats within the System as well as ensure that the biological integrity, diversity, and environmental health of the System are maintained. [House Report 105-106](#) accompanying the Improvement Act states that “the fundamental mission of our System is wildlife conservation: wildlife and wildlife conservation must come first.” Biological integrity, diversity, and environmental health are critical components of wildlife conservation. As later made clear in the Biological Integrity, Diversity, and Environmental Health Policy ([601 FW 3](#)), “the highest measure of biological integrity, diversity, and environmental health is viewed as those intact and self-sustaining habitats and wildlife populations that existed during historic conditions.”

Under the Refuge Administration Act, each refuge must be managed to fulfill the Refuge System mission as well as the specific purposes for which it was established. The Refuge Administration Act requires the Service to monitor the status and trends of fish, wildlife, and plants in each refuge.

Additionally, the Refuge Administration Act identifies six wildlife-dependent recreational uses for the Refuge System. These uses are hunting, fishing, wildlife observation and photography, environmental education and interpretation. Under the Refuge Administration Act, the Service is to grant these six wildlife-dependent public uses special consideration in the planning for, management of, and establishment and expansion of units of the National Wildlife Refuge System. When determined compatible on a refuge-specific basis, these six uses assume priority status among all uses of the refuge in question. The Service is to make extra efforts to facilitate priority wildlife-dependent public use opportunities.

When preparing a CCP, refuge managers must re-evaluate all general public, recreational, and economic uses (even those occurring to further refuge habitat management goals) proposed or occurring on a refuge for appropriateness and compatibility. No refuge use may be allowed or

continued unless it is determined to be appropriate and compatible. Generally, an appropriate use is one that contributes to fulfilling the refuge purposes, the Refuge System mission, or goals or objectives described in a refuge management plan. A compatible use is a use that, in the sound professional judgment of the refuge manager, will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge. Updated appropriate use and compatibility determinations for existing and proposed uses for Malheur National Wildlife Refuge are in Appendices A and B of this CCPS.

The Refuge Administration Act also requires that, in addition to formally established guidance, the CCP must be developed with the participation of the public. Issues and concerns articulated by the public play a role in guiding alternatives considered during the development of the CCP and together with other formal guidance, can play a role in selection of the management direction. It is Service policy that CCPs are developed in an open public process and that the agency is committed to securing public input throughout the process. Appendix J of the CCP details public involvement that has been undertaken during the CCP process.

1.5.3 Other Laws and Mandates

Many other laws govern the U.S. Fish and Wildlife Service and Refuge System lands. Examples include the Migratory Bird Treaty Act of 1918, Refuge Recreation Act of 1962, National Historic Preservation Act of 1966, and the Endangered Species Act of 1973. For additional information, a list and brief description of laws of interest can be found at <http://www.fws.gov/laws/Lawsdigest.html>.

All laws that pertain to the National Wildlife Refuge System are implemented through regulations covering the National Wildlife Refuge System, published in Title 50, subchapter C of the Code of Federal Regulations ([50 C.F.R. 401-453](#)). These regulations govern general administration of units of the Refuge System.

The Refuge System also maintains and updates a Refuge System manual, which elaborates upon these laws and regulations and provides further policy and guidance for the Refuge System. Over the last few years, the Service has developed or revised numerous policies and Director's Orders to reflect the mandates and intent of the Improvement Act. Some of these key policies include the Biological Integrity, Diversity, and Environmental Health Policy ([601 FW 3](#)); the Compatibility Policy ([603 FW 2](#)); the Comprehensive Conservation Planning Policy ([602 FW 3](#)); Mission, Goals, and Purposes ([601 FW 1](#)); Appropriate Refuge Uses ([603 FW 1](#)); Wildlife-dependent Public Uses ([605 FW 1](#)); Wilderness-related Policies ([610 FW 1-5](#)); and Coordination and Cooperative Work with State Fish and Wildlife Agencies ([601 FW 7](#)). These policies and others in draft or under development can be found at <http://refuges.fws.gov/policymakers/nwrpolicies.html>.

1.5.4 Summary Hierarchy of Guidance

In developing a CCP, a refuge must consider the various broader laws, regulations, missions, goals, and policies. The CCP must be consistent with these and also with the refuge's purpose, when addressing refuge-specific issues and goals. Figure 1-1 illustrates the hierarchy of planning guidance for refuges.

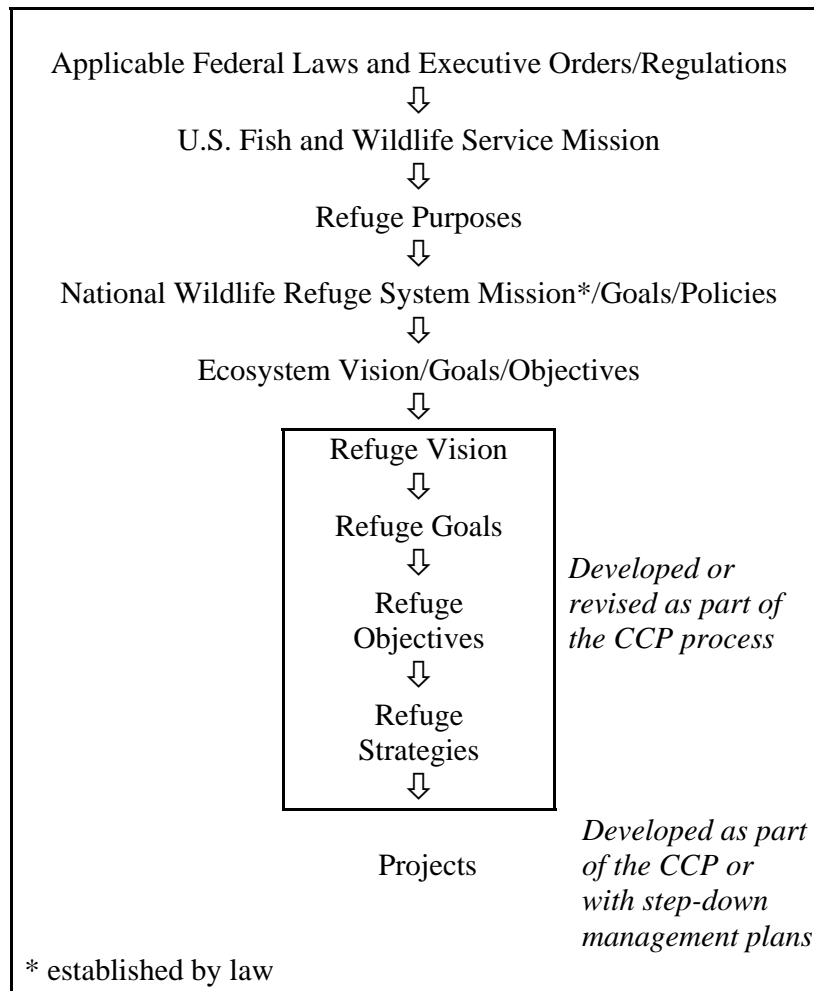


Figure 1-1. Hierarchy of guidance within the National Wildlife Refuge System.

1.6 Refuge Establishment and Purposes

1.6.1 Legal Significance of the Refuge Purpose

The purpose for which a refuge was established or acquired is of key importance in refuge planning. Purposes must form the foundation for management decisions. The refuge purposes are a driving force in the development of the refuge vision statements and goals in a CCP and are critical to determining the compatibility of existing and proposed refuge uses.

The purposes of a refuge are specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge subunit.

Unless the establishing law, order, or other document indicates otherwise, purposes dealing with the conservation, management, and restoration of fish, wildlife, and plants, and the habitats on which they depend take precedence over other purposes in the management and administration of any unit.

Where a refuge has multiple purposes related to fish, wildlife, and plant conservation, the more specific purpose will take precedence in instances of conflict.

Refuges often consist of units that were acquired at different times and under different authorities. The original establishing purpose applies to each and every unit of a refuge, regardless of when it was acquired. When an additional unit is acquired under an authority different from the authority used to establish the original unit, the addition takes on the purpose of the original unit, but the original unit does not take on the purpose of the addition.

By law, refuges are to be managed to achieve their purposes. When a conflict exists between the Refuge System mission and the purpose of an individual refuge, the refuge purpose may supersede the Refuge System mission.

1.6.2 Purpose and History of Refuge Establishment

Malheur Refuge encompasses three main units that were established at different times. The following discussion is organized by these units. The purposes are also summarized at the end of the discussion.

Malheur, Mud, and Harney Lakes

When the Refuge was established in 1908, Euro-Americans had been living on homesteads and ranches in the area for nearly 40 years. As is common elsewhere in the arid west, access to water was the determining factor for settlement. However, the shifting shorelines of Malheur, Mud, and Harney lakes, combined with an absence of legal surveys, created a situation where ownership boundaries and governmental authorities were ambiguous. Homesteaders and ranchers competed for control over riparian areas and water, essential to livelihood in these arid regions. Ownership rights were legally murky because Oregon had not codified its water law and because the boundary between “land” and “riparian areas” is fluid (Langston 2003). As a result, the early years of settlement (prior to and after refuge establishment) were marked by prolonged legal wrangling among the Federal and State governments and private landowners over authorities and ownership lines. The following discussion includes some of the legal history that occurred as these issues were resolved.

In 1895, no wildlife refuges existed anywhere in the nation. During this year, in response to several court cases disputing land title and the legal doctrines governing water and riparian use, the U.S. government initiated survey of a meander line around Malheur, Mud, and Harney lakes. Known as the Neal Survey, it established a legal boundary between lands held in private ownership and those lands and waters held by the government as public domain lands. The meander line helped to distinguish land acquired under a homestead claim from surrounding lands held in ownership by the Federal government. A 1901 U.S. Supreme Court ruling, *Marshall v. French*, determined that Marshall’s homestead claim on Malheur Lake, which straddled the meander line, had been made on lands within the public domain rather than lands claimed by the French-Glenn Livestock Company, thus settling a dispute between the two landowners. This decision by the Supreme Court provided a legal basis for the President to declare unclaimed lands around the lakes as Federal property when the Refuge was established.

As described in Section 1.1, plume hunters wreaked havoc on Malheur Lake, decimating its waterbird colonies by 1898. Wildlife photographers William L. Finley and Herman T. Bohlman documented the destruction and observed only limited recovery on the lake even after 10 years.

They, in concert with the Oregon Audubon Society, petitioned the Federal government for establishment of a bird reservation on the lakes.

Government lands within the Neal Survey line were set aside on August 18, 1908, by President Theodore Roosevelt using Executive Order No. 929 “as a preserve and breeding ground for native birds.” A letter dated August 12, 1908, to the President from the Secretary of the Interior stated that the purpose and intent was “to preserve the habitat values of the three lakes for migratory waterfowl, and especially, the colonial nesting species.” The new Lake Malheur Reservation¹ purportedly encompassed 81,786 acres around the lakes but was unsurveyed at the time of establishment and the exact acreage for the new reservation was not known.

In 1916, the State of Oregon filed a claim for title to Malheur Lake as part of an effort to reclaim wetlands for agricultural purposes. The State argued that it had legal jurisdiction over lands within the meander line of all navigable bodies of water within the state, including Malheur Lake. In 1935, the Supreme Court, using the decision in *Marshall v. French*, upheld a lower court ruling that the State did not have title under its navigability claim and that the United States had not abandoned any lands by issuing patents. However, the Court also ruled that homestead claims on Malheur, Mud, and Harney lakes still needed to be reviewed and settled before the Federal government could take possession. The Federal government made offers to buy out the homesteads, but a “fair” price for inholdings could not be agreed upon.

In the interim, President Herbert Hoover issued Executive Order No. 5891 on July 16, 1932, which temporarily withdrew all public lands around Malheur and Harney lakes for classification as to their suitability for migratory bird refuge purposes. Plot locations but not exact acreages were identified. On June 1, 1933, President Franklin D. Roosevelt issued Executive Order No. 6152, which withdrew additional public lands west of Harney Lake and in the Silver Lake area for a similar suitability study.

In June 1934, Executive Order No. 6724, Declaration of Taking, provided funds under the “Emergency Conservation Fund (transfer from War to Agriculture—Act of March 31, 1933-March 31, 1935)” known as the \$10,000,000 fund for the purchase of 3,845.84 acres below the Neal meander line from willing sellers on Malheur, Mud, and Harney lakes.

During the Great Depression years, drought hit the area and lake levels receded with decreased precipitation. As a result, adjacent landowners increased their agricultural practices on the newly exposed land. In December 1936, the U.S. filed suit against landowners claiming ownership of lands inside the meander line. The Ninth Circuit Court of Appeals ruled in favor of the private landowners but did not attempt to apportion the lands among the individuals involved, so the Federal government continued to administer the lake area (including the exposed areas now farmed by settlers) as a waterfowl refuge.

In 1937, the U.S. government asked that Malheur Lake be placed in receivership (i.e., administered by an uninterested third party) until all land within the meander line was purchased or condemned. The courts complied and a receiver appointed by the court regulated, by permit, the use of lakebed lands by adjacent landowners. Funds received from economic permits on the Refuge were held by a

¹ The original name “The Lake Malheur Reservation” was changed to Malheur Migratory Bird Refuge on July 19, 1935. On July 25, 1940, Presidential Proclamation No. 2416 officially changed the name from Malheur Migratory Bird Refuge to Malheur National Wildlife Refuge.

court-appointed receiver until 1940, when the receivership was dissolved after another court ruling upheld the ruling of private ownership.

In an attempt to hasten some sort of court action that would define ownership boundaries within the meander line of Malheur Lake, a presidential proclamation was sought to close the lake to economic use. Proclamation No. 2516, dated October 1, 1941, “closed all lands within the Meander Line of Malheur and Harney Lakes and the streams and waters connecting said lakes to the taking, capturing or killing, or attempting to take, capture, or kill migratory birds.” A modification of the hunting closure on Malheur Lake came via Presidential Proclamation No. 2818 (in 1948). This proclamation made it possible to open portions of the lake to hunting (approximately 4,241 acres). Proclamation No. 2859 (in 1949) redefined those areas closed to hunting and again expanded the portion of the lake open to hunting. The hunting area was increased a third time by order of the Secretary of Interior on October 21, 1953. The remainder of the original refuge area established in 1908 remained closed to hunting until November 19, 1982. On that date, the proclamation closures were eliminated and now no longer serve as a legal constraint to waterfowl hunting (USFWS 1985).

In April 1944, the Oregon U.S. District Court ruled in the case of the *United States v. Malheur Lake Property Owners*. The ruling found that 1) the original Neal Survey meander line was a valid survey of the lake boundary; 2) Executive Order No. 929 establishing Malheur Lake Reservation was valid; and 3) the patentees of lands through which the Neal Survey line passed or bounded did have property rights that extended to the center of Malheur Lake. The court also defined the exact location of the centerline of the lake, which generally ran east-west through the lakebed. The boundaries of the tracts claimed by the defendants were specifically laid out and designated as legally owned private tracts. The court decreed that 23,947.10 acres were held in private ownership, and 23,913.30 acres were in government ownership. It also ruled the government should compensate those landowners for use and occupation of the defendants’ land since January 1937. No specific amount was set for compensation.

In September 1944, the Migratory Bird Conservation Commission approved the acquisition of all of the privately owned lands within the meander line of Malheur Lake. Negotiations were undertaken in the hopes of reaching price agreement with the owners of this property, but this effort failed. Negotiations continued and agreements were finally reached for the purchase of 13,003.84 acres. In January 1945, the Secretary of the Interior requested that condemnation proceedings be filed for the remaining 10,943.26 acres of privately owned property within the lakebed of Malheur Lake.

In 1947, Federal condemnation hearings were held in Burns for the remaining tracts on Malheur Lake. The Federal government had offered \$10 per acre for similar tracts on the lake and the defendants, using testimony from similar hearings in the Klamath Falls area, felt that the value should be \$100 per acre. The court accepted the value of \$100 per acre, and the government dropped their condemnation proceedings. The Refuge negotiated with the remaining landowners over the next nine years and through purchase or exchange managed to acquire the remaining lakebed lands within the Neal Survey meander line of Malheur Lake.

Public Land Order (PLO) No. 1511 on September 24, 1957 revoked Executive Orders 929, 5891, and 6152 and amended Executive Order 7106:

Executive Order No. 7106 of July 19, 1935, establishing the Malheur Migratory Bird Refuge which was redesignated the Malheur National Wildlife Refuge by Proclamation No. 2416 of July 25, 1940, is hereby amended by eliminating from the first paragraph thereof the words

“and in order to effectuate further the purposes of the Migratory Bird Conservation Act (45 Stat. 1222)” ... Subject to valid existing rights, the following-described public lands in Harney County, Oregon, are hereby withdrawn from all forms of appropriation under the public-land laws, including the mining but not the mineral leasing laws, and reserved under the jurisdiction of the Bureau of Sport Fisheries and Wildlife of the Department of the Interior as an addition to the Malheur National Wildlife Refuge.

The legal description of an additional 18,017.54 acres was included in this PLO and added to the 22,016.54 acres of public land that was originally withdrawn by Executive Orders No. 5891 and No. 6152.

The PLO withdrew lands of the public domain from all forms of appropriation under public land laws, including homesteading, desert land, and small mining, but not the mineral leasing laws, and reserved those lands solely under the jurisdiction of the Bureau of Sport Fisheries and Wildlife (now known as the U.S. Fish and Wildlife Service). In total, 40,034.08 acres around Malheur and Harney lakes were withdrawn from the public domain under this PLO.

Between 1978 and 1983, three additional tracts were added to the Refuge. The 1,518-acre Hill Tract just west of Refuge Headquarters was the last large portion of lakebed to be acquired and was purchased in 1978. A 1981 exchange involved acquisition of 480 acres on Harney Lake for 950.36 acres in the Kern Reservoir area above Krumbo Reservoir. In 1983, 80 acres of lakebed within the meander line on the north side of Malheur Lake was exchanged for 120 acres above the meander line. PLO No. 6470 was issued by the Secretary of the Interior on September 26, 1983. The order transferred 199.9 acres on the east side of Malheur Lake from the jurisdiction of the Bureau of Land Management (BLM) to the Service.

A 2,462-acre inholding on Mud Lake was acquired in 1984 in exchange for 1,042 acres of refuge land in the Diamond Swamp area. Acquisition of the Mud Lake property would allow the Refuge to better manage the flow of water and lands of the Dunn Ranch (Mud Lake area) to benefit migratory birds, which are the primary management concern for the Refuge.

In exchange for 277 acres of refuge land in the Diamond Swamp area deemed to have low wildlife value, 360 acres of private land in the center of Mud Lake were acquired in 1999. The final acquisition in the 1990s was the divestment, in 1999, of 28 acres north of Frenchglen to the State of Oregon for part of a 904-acre parcel on Mud Lake; the remainder of the acreage was acquired through purchase. The last two acquisitions would protect wetland habitat and help to maintain or improve water quality in Mud, Harney, and Malheur lakes, while consolidating an irregular boundary.

A 240-acre parcel on the southeast side of Mud Lake was donated to the Refuge in 1994 by the Hunt family. In 1998, the 362-acre Opie parcel on the north side of Malheur Lake in the vicinity of Lawen was purchased using Migratory Bird Conservation Commission funds to support wildlife-dependent uses and to protect wetland habitat and Malheur Lake water quality.

Land acquisitions between 2000 and 2003 focused on property on the south side of Malheur Lake. Migratory Bird Conservation Commission funds were used to purchase 280 acres on the southwest side of the lake to protect wetland habitat and Malheur Lake water quality. Migratory Bird Conservation Commission funds were again used to purchase 702.78 acres on the south side of Malheur Lake in 2001. A 2003 exchange and purchase of 267 acres on the south side of Malheur

Lake for 193 acres in the Diamond Swamp vicinity was the most recent land acquisition. The last two acquisitions were made to protect wetland habitat; help to maintain or improve water quality in Mud, Harney, and Malheur lakes; and consolidate an irregular boundary.

The Blitzen Valley

The cyclical trends of drought and flood in the Great Basin were made dramatically apparent when Malheur Lake dried up in the early 1930s. Recognizing that the lake could not be viewed in isolation from its primary sources (the Donner und Blitzen River and the Silvies River), William L. Finley again played an integral role in the Refuge's history by championing purchase of the Blitzen Valley as an addition to the Refuge. Control of the valley meant control of the Blitzen River and control of the river allowed the reservation to restore water to the lakes (which were dry as a result of the drought) by releasing water held behind ranch dams. The addition of the Blitzen Valley was aimed at acquiring the water rights held in private ownership for waters flowing from Steens Mountain and ultimately ending in Malheur Lake.

The 64,717-acre Blitzen Valley portion of the Refuge was acquired from the Eastern Oregon Land and Livestock Company for \$675,000 on February 21, 1935 using funds made available pursuant to the provisions of the *Act for the Relief of Unemployment through the Performance of Useful Public Work* (48 Stat. 22) and the National Industrial Act (48 Stat. 195). The Blitzen Valley addition was formally added to the Lake Malheur Reservation under Executive Order No. 7106 signed by President Franklin D. Roosevelt on July 19, 1935. The order specified that the land was for use "as a refuge and breeding ground for migratory birds and other wildlife." At the same time, the name of the reserve was changed to Malheur Migratory Bird Refuge.

An additional 1,125.20 acres of Blitzen Valley land held in private ownership was purchased in 1936 with funds made available by the N.I.R., Agriculture, Wildlife Refuges Fund, known as the \$6,000,000 fund. This fund conferred migratory bird purposes for lands (Castineira 2010).

PLO No. 4661 was issued by the Secretary of the Interior on April 16, 1969. In this PLO, 4,021.14 acres of small tracts of scattered uplands above the Blitzen Valley, acquired as part of the Eastern Oregon Land and Livestock Company Blitzen Valley acquisition, were deemed to have limited wildlife value and were relinquished to BLM jurisdiction.

Other additions to the Refuge were made in the 1990s. In 1997, a 225-acre parcel at the south end of the Blitzen Valley was purchased with funds reprogrammed from the land acquisition fund for San Francisco Bay National Wildlife Refuge. This parcel was acquired for use as an administrative area for operations at the south end of the Blitzen Valley; moving operations at the P Ranch to a less public location. A 320-acre tract inholding in the Dunn Dam vicinity of the Blitzen Valley was acquired in 1998 under the authority of the Migratory Bird Conservation Commission Act of 1929 (as amended).

Double-O

The Double-O Unit was added to the Refuge in 1941. The deepening nationwide Depression and the ongoing drought forced reductions in the number of cattle the land could support. The Hanley family sold 14,517.89 acres at the Double-O to the U.S. government for addition to the Refuge under authority of the Migratory Bird Conservation Commission Act of 1929 (as amended) for \$116,143 as "a reservation for migratory birds."

Summary of Refuge Purposes

- “a refuge and breeding ground for migratory birds and other wildlife” Executive Order No. 7106, dated July 19, 1935, as modified by PLO No. 1511, dated September 24, 1957.
- “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds” [16 U.S.C. 715d](#) (Migratory Bird Conservation Act).
- “for the development, advancement, management, conservation, and protection of fish and wildlife resources” [16 U.S.C. 742f\(a\)\(4\)](#).
- “for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude” [16 U.S.C. 742f\(b\)\(1\)](#) (Fish and Wildlife Act of 1956).
- “conservation, management, and ... restoration of the fish, wildlife, and plant resources and their habitats ... for the benefit of present and future generations of Americans” [16 U.S.C. 668dd\(a\)\(2\)](#) (National Wildlife Refuge System Administration Act).

1.6.3 Land Status and Ownership

Table 1-1. Malheur Refuge Acreage by Type of Acquisition

Type of Acquisition	Acres
Acquired by purchase, willing seller	43,665.57
Acquired by purchase, condemnation (E.O. No. 6724)	5,070.39
Acquired by purchase (Blitzen Valley Project)	64,713.54
Acquired by exchange	12,287.73
Withdrawn from public domain	73,222.07
Acquired by donation	240
<i>Out of fee title by exchange/sale/transfer</i>	<i>-11,442.76</i>
Total	187,756.54

Source: USFWS 2011.

1.7 Relationship to Other Plans and Assessments

1.7.1 Previous and Future Refuge Plans

Previous Refuge Plans: Several previous comprehensive planning efforts have guided decisions and operations at Malheur Refuge. In the early 1980s, under the leadership of Joe Mazzoni and George Constantino, the Master Plan was developed (USFWS 1985), which outlined major “outputs” of the Refuge (both wildlife and public use), and outlined wildlife, public use, and land/water management strategies by refuge unit. It replaced the former Master Plan Technical Report, prepared in March 1965.

Unit-specific five-year plans were prepared subsequent to the completion of the Master Plan. The Blitzen Valley Management Plan (USFWS 1990) was signed by then-Refuge Manager Forrest Cameron. The focus of this document was to improve the Blitzen Valley’s ability to meet migratory

bird production objectives as outlined in the 1985 Master Plan. With the selection of seven focal species, this plan, and focused primarily on water management, carp, predator, and vegetation management issues. Prescriptions in the plan were documented for six units delineated within the Blitzen Valley.

Similarly, the Double-O Habitat Management Plan (David and Ivey 1995) was a step-down management plan. While less detailed than the Blitzen Valley Management Plan, it outlined major actions to be pursued within the unit.

Future Refuge Planning: The CCP will be revised every 15 years or earlier if monitoring and evaluation determine that changes are needed to achieve refuge purposes, vision, goals, or objectives. The CCP provides guidance in the form of goals, objectives, and strategies for refuge program areas but may lack some of the specifics needed for implementation. Step-down management plans will therefore be developed for individual program areas, as needed, following completion of the CCP. Step-down plans require appropriate NEPA compliance.

1.7.2 Ecosystem Plans and Assessments

When developing a CCP, the Service considers the goals and objectives of existing national, regional, state, and ecosystem plans and/or assessments. The CCP is expected to be consistent, as much as possible, with existing plans and assist in meeting their conservation goals and objectives ([602 FW 3](#)). This section summarizes some of the key plans reviewed by members of the core team (Appendix I) while developing the CCP.

Migratory Birds

Birds of Conservation Concern: The [1988 amendment](#) to the [Fish and Wildlife Conservation Act](#) mandates the USFWS to “identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973.” Based on the efforts and assessment scores of three major bird conservation efforts (Partners in Flight, the U.S. Shorebird Conservation Plan, and the North American Waterbird Conservation Plan), this report (USFWS 2008) identifies, by Bird Conservation Region (BCR), the bird species most in need of conservation attention. Waterfowl game species covered by the North American Waterfowl Management Plan are excluded from the list. Malheur Refuge is located within BCR Region 9, for which 28 species are listed. The list includes two waterbirds, three shorebirds, and several raptors. The rest are upland or riparian associated species.

Partners in Flight (PIF): The primary goal of the Conservation Strategy for Landbirds in the Columbia Plateau of Eastern Oregon and Washington (Altman and Holmes 2000) is to ensure long-term maintenance of healthy populations of native landbirds. Focal species and habitat objectives for habitat types present at the Refuge, including riparian shrub, cliffs and rimrock, steppe-shrubland, sagebrush, shrublands, and juniper-steppe. Malheur Refuge is targeted in this plan as important for two focal species: yellow-billed cuckoo and bobolink.

North American Waterfowl Management Plan: This plan, first formulated in 1986, provides a strategy to protect North America’s remaining wetlands and to conserve waterfowl populations through habitat protection, restoration, and enhancement. The plan was updated in 2004 with an emphasis on strengthening the biological foundation, using a landscape approach, and expanding

partnerships. The 2004 update contains species-specific population objectives and evaluations of whether the continental population is currently short or over the target. There are also flyway goals for production by species, but the plan did not target population objectives for wintering or migratory waterfowl by area (North American Waterfowl Management Plan 2004). Implementation of this plan is accomplished at the regional level by partnership, within 11 Joint Venture areas. Malheur Refuge is located within the area of the Intermountain West Joint Venture.

Pacific Flyway Plans: Flyway management plans are the products of Flyway Councils, developed to help State and Federal agencies cooperatively manage migratory game birds. Several flyway management plans pertain to Malheur Refuge, but specific management objectives are not identified for the Refuge in these plans. Species that occur on the Refuge and are identified in these plans as important are:

- Pacific population of western Canada geese (Subcommittee on Pacific Population of Western Canada Geese 2000)
- Wrangel Island population of lesser snow geese (Pacific Flyway Council 2006)
- Rocky Mountain population of trumpeter swans (Pacific Flyway Study Committee)

Intermountain West Regional Shorebird Management Plan: This plan (Oring et al. 2000) notes that perhaps a million shorebirds breed in the Intermountain West and that millions more migrate through the area each year. The plan recognizes that finding ample high-quality fresh water will be the greatest challenge faced by shorebirds in the Intermountain West. The regional plan articulates seven goals and associated objectives and strategies related to habitat management, monitoring and assessment, research, outreach and planning. The Harney Basin is recognized as a Key Shorebird Area. High priority species found in eastern Oregon include 10 of the 13 species in the Intermountain West with scores of 4 or 5 in the plan's species scoring process. These high priority species include snowy plover, black-necked stilt, American avocet, willet, long-billed curlew, marbled godwit, western sandpiper, least sandpiper, long-billed dowitcher, Wilson's phalarope and red-necked phalarope.

Intermountain West Joint Venture Coordinated Implementation Plan for Bird Conservation in Eastern Oregon: This plan (Oregon Habitat Joint Venture 2005) identified important habitat types for bird conservation, including flood-irrigated pastures and hay meadows, alkaline wetlands, emergent marsh, wet meadows, and riparian shrub are identified to provide a strategic framework for site-specific habitat protection and restoration projects within the priority areas in eastern Oregon. The plan recommends specific acreage figures in the Harney Basin for the following habitat types:

- Grassland: 3,000
- Sagebrush steppe: 5,000
- Playa vernal pool: 20,000
- Pasture-hay: 70,000
- Alkaline wetlands: 20,000
- Emergent marsh: 40,000
- Wet meadow: 30,000
- Riparian shrub: 2,000

Oregon Closed Basin: Wetlands Implementation Plan (Ivey 2000): This plan recommends objectives and strategies related to conservation of wetlands for the Oregon Closed Basin, the Oregon portion of the Northern Great Basin. This plan has several key recommendations:

- Improve water delivery system to enhance efficiency and flexibility of irrigation and wetland management strategies.
- Protect at least an additional 10,000 acres through acquisition of lands from willing sellers.
- Improve passage and screening facilities to enhance the Blitzen River and tributaries for Great Basin redband trout and other native fishes.
- Use fishways, traps, and screens to limit common carp migration into the Blitzen River and Double-O Unit to enhance productivity of wetlands and other aquatic habitats.
- Enhance 30 miles of in-stream riparian habitat in the Blitzen River and tributaries for redband trout and other native fish and wildlife. Improve 40 miles of Blitzen River and Bridge Creek channels to restore more natural hydrology and improve water quality.
- Improve water management capabilities in 1,100 wetland acres of the Double-O Unit to allow better wetland management and carp control.
- Enhance wetlands by improving brood ponds to reduce predation on breeding waterfowl and waterbirds.
- Control invasive exotic plants on 30,000-40,000 acres and develop strategies to prevent future introductions.

State Plans

Oregon Conservation Strategy (OCS): This document, authored by the Oregon Department of Fish and Wildlife (ODFW 2006) is an overarching strategy for conserving fish and wildlife within Oregon. The Strategy identifies specific Conservation Opportunity Areas (COAs) where high-priority species and habitat conservation may be most efficiently addressed. The Harney-Malheur area is identified as COA No. NBR-08. Key habitats identified in the OCS for this COA include riparian and wetlands. The plan references conservation actions for these and other habitats included in other planning documents. Some of the plan's conservation actions relate directly to the Refuge:

- Initiate actions to maintain alkaline wetland habitats in conservation status at the following locations: 20,000 acres (Harney Basin).
- Initiate actions to maintain emergent wetland habitats in conservation status at the following locations: 40,000 acres (Harney Basin).
- Initiate actions to maintain wet meadow habitats in conservation status at the following locations: 50,000 acres (Harney Basin); 10,000 acres (Silvies/Bear Valley); 20,000 acres (Malheur Refuge Headquarters).
- Initiate actions to maintain riparian shrub habitats in conservation status at the following locations: 2,000 acres (Harney Basin); 300 acres (Aldrich Mountains); 200 acres (Malheur Refuge Headquarters).
- Restore drainage; improve water management facilities; use fishways, traps, and screens to limit carp migration to enhance productivity of wetlands and other aquatic habitats: Malheur Lake, Harney Basin.
- Improve fish passage; for example, modify barriers or use spans where appropriate.

Nine mammals, 15 plants, three herptiles, eight invertebrates, 16 fish species, populations or segments, and 15 birds are listed as strategic (high priority) species in the OCS. Many of these species are found on Malheur Refuge.

State Comprehensive Outdoor Recreation Plan: A detailed summary is provided in Chapter 5, Section 5.7.2

1.8 Special Designation Lands

1.8.1 Important Bird Areas

Malheur Refuge has been designated by the Audubon Society as an Important Bird Area (IBA). This program recognizes that habitat loss and fragmentation are the most serious threats facing populations of birds across America and around the world. An IBA is a site that provides essential habitat for one or more species of birds and that is recognized as being important on a global, continental, or state level. IBAs often support a significant proportion of the total population of one or more species. In the United States, the IBA program has become a key component of many bird conservation efforts, including Partners in Flight, North American Waterbird Conservation Plan, and the U.S. Shorebird Conservation Plan (Audubon 2011).

Malheur Refuge was selected and approved as an IBA for the following reasons (Audubon IBA 2008):

- It hosts 20 percent of the of the world's population of white-faced ibis.
- It has high densities of willow flycatchers.
- It has one of the highest Breeding Bird Survey counts for the watch-listed Brewer's sparrow.
- It supports breeding populations of watch-listed western snowy plover (400 individuals), long-billed curlew, Franklin's gull, short-eared owl, bobolink, and trumpeter swan.
- Significant populations of American white pelican, cinnamon teal, and redhead use the Refuge for breeding.
- It supports 20 percent of Oregon's breeding population of greater sandhill cranes.
- The Refuge supports breeding populations of Franklin's gulls, Forster's terns, Caspian terns, and black terns.
- Great blue herons and great egrets nest on the Refuge in scattered colonies.
- Post-breeding concentrations of ring-billed gulls sometimes reach 25,000 in August.
- Up to half of the world populations of Ross's geese pass through the area.
- A significant proportion of the total populations of green-winged teal, American wigeon, northern shoveler, northern pintail, canvasback, and ruddy duck pass through the Refuge.
- Hundreds of thousands of waterfowl (including up to 100,000 snow geese, 15,000 green-winged teal, 15,000 mallards, 250,000 northern pintail, 250,000 northern shovelers, 4,000 canvasbacks, 2,000 ring-necked ducks, 5,000 lesser scaup, and 50,000 ruddy ducks) pass through the Refuge during migration.
- Concentrations have been recorded of up to 25,000 western sandpipers, 350 pectoral sandpipers, 35,000 long-billed dowitchers, 15,000 Wilson's phalaropes, 15,000 American avocets, and 200 black-necked stilts.

1.8.2 Wilderness Status

There is no designated wilderness within Malheur Refuge. However, a wilderness review was conducted in conjunction with the CCP process as outlined in [602 FW 1](#) and [602 FW 3](#). The purpose of a wilderness review is to identify and, if appropriate, recommend for congressional designation National Wildlife Refuge System lands and waters that merit inclusion in the National Wilderness Preservation System.

The wilderness review process consists of three phases: wilderness inventory, wilderness study, and wilderness recommendation. Lands and waters that meet the minimum criteria for wilderness are identified in the inventory phase. These areas are called wilderness study areas (WSAs). WSAs are evaluated through the CCP process to determine their suitability for wilderness designation. In the study phase, a range of management alternatives are evaluated to determine if a WSA is suitable for wilderness designation or management under an alternate set of goals and objectives that do not involve wilderness designation. The recommendation phase consists of forwarding or reporting recommendations for wilderness designation from the Director through the Secretary of the Interior and the President to Congress in a wilderness study report.

Through this process, 10 units were defined for evaluation (see Appendix D) on the Refuge. The majority of Malheur Refuge is a highly altered wetland and upland system. The lands and waters have been significantly altered prior to and during Service ownership. The Refuge has actively managed these lands to meet the needs of wildlife species at both refuge and Pacific Flyway levels to enable the Refuge to meet its establishing purposes. The effects of management have included changes to the soils, flora, and fauna. Human-made developments abound in the form of an extensive road system; hundreds of miles of primary dikes, ditches, and fences; altered creeks and river; and thousands of water management structures.

Three units of the Refuge (Malheur Lake, Upper Bridge Creek/Knox Springs, and Barnes Springs) may potentially exhibit wilderness characteristics that are currently not present. Each of these areas is experiencing significant invasive species (plant and or animal) impacts that compromise the achievement of refuge purposes, the NWRS mission, and biological integrity, diversity, and environmental health.

In this inventory (Phase I), the Harney Lake Unit was found to meet the minimum wilderness criteria for size, naturalness, and outstanding opportunities for solitude and primitive/unconfined recreation. A total of 31,157 acres were found to have wilderness characteristics, which is 1,157 acres greater than an existing WSA proposed in 1969 that was never finalized (see Appendix D, Section D.1.4). Based on the findings in this inventory Harney Lake will be further evaluated in the wilderness study phase as a step-down process to the CCP.

1.8.3 Research Natural Areas

The Refuge manages two Research Natural Areas (RNAs): the Harney Lake RNA and the Stinking Lake RNA. RNAs are part of a Federal system of tracts protected for research and educational purposes. Each constitutes a site where natural features are preserved for scientific purposes and natural processes are allowed to dominate. The main purposes are to provide

1. baseline areas against which effects of human activities can be measured;
2. sites for study of natural processes in undisturbed ecosystems; and
3. gene pool preserves for all types of organisms, especially rare and endangered species.

According to the Standards and Policy Guidelines issued for RNAs (Dec. 1976 revision), an RNA is a unit in which natural conditions are maintained except when deliberate manipulation maintains the unique features of the site.

Refuge policy on RNAs (8 RM 10) addresses RNA management and stresses that RNAs must be reasonably protected from any influence that could alter or disrupt the characteristic phenomena for which the area was established. RNA policy encourages discontinuing recreational uses if these uses threaten serious impairment of research or education values. Vegetation management is permitted only where necessary to preserve vegetation, and must be documented in a plan approved by the Regional Director. Natural processes are stressed for wildlife population management.

The guiding principle in management of RNAs is to prevent unnatural encroachments (activities which directly or indirectly modify ecological processes on the tracts). Uncontrolled grazing is not allowed, nor is public use that threatens significant impairment of scientific or educational values. Management practices necessary for maintenance of the ecosystem may be allowed.

Harney Lake Research Natural Area: The Harney Lake RNA was established in 1975 to “exemplify southeast Oregon alkaline lakes (playas) and associated vegetation and wildlife” (Copeland 1979). The RNA encompasses 30,000 acres and consists of the 28,000-acre lake itself and a 2,000-acre strip of land surrounding the lake (see Map 11). The lake is a vast body of very shallow water during wet periods and a vast alkali flat in dry periods. At the lowest elevation in the Harney Basin, the lake exceed 10 feet in depth during the flood of the mid-1980s.

The RNA includes habitat for snowy plovers, avocets, American white pelicans, terns, and migrating ducks and geese. Raptors, including golden and bald eagles, use the area at least seasonally. Among the animal species known or expected to use the RNA are 33 bird and 13 mammal species which were identified as species of concern in Oregon at the time the RNA was established. These include nesting golden eagles, prairie falcons, and snowy plovers. Mammals of special concern include the Malheur shrew, Merriam’s shrew, and the northern grasshopper mouse.

Significant changes in substrate, alkalinity, and moisture occur over short distances on Harney Lake. These changes produce a complex, intergrading mosaic of plant communities, which can be broadly described as saltbush-greasewood, sagebrush steppe, and tule marshes. The lakebed is mostly devoid of vegetation; however, bulrush communities surround small springs on the southern and eastern portions of the lake.

Stinking Lake Research Natural Area: The Stinking Lake RNA was established in 1975 to “preserve and example of a small, spring-fed alkaline lake in southeast Oregon and the associated high desert vegetation and wildlife” (Copeland and Greene 1982). Important natural features include a variety of salt desert plant communities, a permanent cold spring and associated wetlands, and a large number of birds and small mammals. The RNA encompasses 1,555 acres in the Double-O Unit of the Refuge (see Map 11). The cold spring on the west side of the lake and precipitation are the only sources of water. The lakebed encompasses 752 acres, but the actual lake surface varies with rainfall and flow volume from the spring. The lake is rimmed on three sides by rimrock and low dunes on the fourth side.

The Stinking Lake RNA is best known for large number of migratory shorebirds using the lake and shoreline. Thousands of American avocets, Wilson's phalaropes, willets, and western sandpipers rest and feed on flies on the saline flats. Certain birds (black-bellied plover, pectoral sandpiper, and dunlin) are rare elsewhere on the Refuge but can often be found at Stinking Lake. Among the animal species known or expected to use the RNA are 19 bird and 14 mammal species which were identified as species of concern in Oregon at the time the RNA was established. Two inhabitants of the spring waters, the speckled dace and a small crayfish, are worth mentioning. The dace appear to differ from other speckled dace in the area. The crayfish is a rare subspecies encountered occasionally in the Harney Basin and some parts of the Snake River drainage (Copeland and Greene 1982).

Vegetation in the RNA consists of salt desert plant communities (saltbush-greasewood, and sagebrush steppe) with small amounts of wetland vegetation (tule marshes) adjacent to the spring and big sagebrush on the rimrock. Along portions of the lakeshore and in highly alkaline areas the vegetation is dominated by alkali saltgrass or Nevada bulrush (Copeland and Greene 1982).

1.9 Planning Process and Issue Identification

1.9.1 Planning Process

A core planning team, consisting of the refuge project leader, deputy project leader, wildlife biologist, ecologist, public use planner, archaeologist, and a regional planner, began developing the CCP in 2009. The core planning team is identified in Appendix I.

Collaborative Process: This CCP was also developed through a collaborative process in order to solicit and incorporate public input throughout all stages of plan development, as well as build support for its content and implementation.

An extended team (see Appendix I), comprising technical specialists versed in resource issues and key intergovernmental partners, assisted in CCP development and was invited to several workshops or consulted via e-mail and conference calls. These groups were particularly important in assisting with focal species selection, defining the ecological considerations and transitions (see Appendix L, Ecology Work Group) and in assisting in developing recommendations for carp assessment and treatment (the Aquatic Health Coalition). Members of the extended team also provided comments at key points in development of the CCP.

A variety of other organizations and individuals contributed to this CCP (see Appendix I). A series of interactive meetings to review key topics addressed in the CCP, review drafts of the CCP, and otherwise facilitate discussion between the Service and stakeholders, was chaired by the Oregon Consensus Program and the High Desert Partnership. Each collaborative meeting was attended by 30-40 participants, including technical experts, scientists, government agencies, conservation organizations, local and statewide residents, recreation groups, Tribal representatives, refuge visitors, and elected officials.

Technical working groups were created by the Service to serve as forums for specific complex resource issues. To address concerns about carp, the Aquatic Health Coalition was created to involve partners in strategizing effective methods for dealing with the carp issue, to leverage partner involvement and to secure funding. Three aquatic health working groups have been formed within the Coalition to develop strategies for carp population assessment, carp control on- and off-refuge,

and partnership enhancement and funding opportunities. Participants include fish and wildlife biologists, researchers, subject matter experts and ecologists from various Federal and State agencies, nongovernmental organizations, and institutions.

To address issues of concern about invasive species and transitions of habitat types, the Refuge established the Ecology Work Group (Appendix L). Consisting of ecologists and wildlife biologists representing a broad assortment of organizations, this group is focusing on the development of habitat models that describe successional conditions and provide guidance in achieving specific plant-community objectives.

Early in the planning process, a review of numerous plans and assessments was completed (see Section 1.7). A comprehensive list of resources of concern was compiled based upon review of the plans referenced above, many of which highlight priority species or habitats for conservation. A workshop was held with the extended team to assist in further defining the list to focus on priority species, species groups, and communities of concern for the Refuge. The final Priority Resources of Concern list is located in Appendix E. Much of the biological emphasis of the CCP is focused on maintaining and restoring these priority resources.

Public use planning centered on developing goals, objectives, and strategies around the Big Six uses. Other non-wildlife-dependent uses that currently occur were also addressed.

Public scoping began in August 2009. Scoping meetings were held in several locations around the region and state. Public comments were also solicited through distribution of a planning update to the Refuge's mailing list, refuge visitors, and other interested parties. A complete summary of public involvement is in Appendix J.

An internal draft was distributed to Service Region 1 reviewers and members of the extended team, collaborative group, and technical working groups including states and the Burns Paiute Tribe, in April 2011. All changes requested by those who reviewed the internal draft and the actual changes made were documented.

1.9.2 Key Issues Addressed in the CCP

An issue is defined as *a concern or problem; a matter that is in dispute; or a vital or unsettled matter* (Merriam-Webster 2011). The primary intent of a planning process is to make sound decisions and to better address problems and concerns. Thus a key component of the planning process is a structured definition of the issues (problems, concerns, opportunities) that lay before us in the current and future management of Malheur Refuge. Each of the issue statements that follow presents background information and is followed by key questions that we hope to resolve in the CCP.

This issue summary is a description of the main management issues facing Malheur Refuge. Issues were derived from discussions with staff, partners, other agencies, longtime refuge observers, and the public. Each of the issues is within the scope of the CCP and they are considered by the Service to be the major issues to address in the planning process:

- The importance of Malheur Refuge and the Silvies floodplain to migratory and breeding birds
- Invasive species, including common carp and perennial pepperweed
- Habitat and vegetation management

- Riverine conditions: geomorphology, hydrology, fisheries, and riparian habitat
- Water system infrastructure and water delivery
- Preserving the legacy of human and paleontological history at Malheur Refuge
- Visitor access, facilities, and information
- Providing quality wildlife observation, photography, interpretation, and environmental education
- Providing quality fishing and hunting opportunities
- Wilderness
- Collaboration

The Importance of Malheur Refuge and the Silvies Floodplain to Migratory and Breeding Birds

Waterfowl: Malheur Refuge and the Silvies floodplain support several priority waterfowl species as defined by the North American Waterfowl Management Plan, including tule and Pacific greater white-fronted goose, northern pintail, mallard, lesser scaup, snow goose, wood duck, redhead, canvasback, ring-necked duck, and American wigeon. The Refuge also supports breeding population of the Rocky Mountain Population trumpeter swans—a priority in the Pacific Flyway.

Historical data show that substantial numbers of these species may occur on the Refuge, varying with habitat conditions. For example, comparing peak refuge counts conducted in the 1980s and 1990s during spring and fall migration with annual Pacific Flyway midwinter population indices, the Refuge has supported up to

- 66 percent of the white goose population (spring 1996);
- 63 percent of the American wigeon population (fall 1993);
- 48 percent of the tundra swan population (in fall 1980 after carp control on Malheur Lake);
- 40 percent of the American green-winged teal population (fall 1993);
- 24 percent of the ruddy duck population (spring 1995);
- 22 percent of the northern shoveler population (fall 1993);
- 10 percent of the northern pintail population (spring 1996); and
- 5 percent of the mallard population (fall 1996).

Additionally, redhead and canvasback duck counts on the Refuge have exceeded the Pacific Flyway midwinter indices (328 percent for redheads in fall 1992 and 148 percent for canvasbacks in fall 1995). This is because the midwinter counts do not include Mexico, where substantial numbers of redheads and canvasbacks winter.

During spring migration, the Silvies River floodplain, which lies just north of the Refuge, supports high numbers of migrant waterfowl. A study conducted by the Service in the late 1970s and early 1980s found that 56 percent of the waterfowl use in the Harney Basin occurred on the private lands of the floodplain during the spring. Scientists from the U.S. Geological Survey (USGS) have documented the importance of such flood irrigated areas in southeastern Oregon and northeastern California; these areas support about 80 percent of the Pacific Flyway pintails during spring migration (Miller et al. 2010). Therefore, it is important for the Refuge to work with private partners on the floodplain with a goal of maintaining these flood irrigation values.

Waterbirds: Malheur Refuge supports the highest number of breeding greater sandhill cranes of any refuge in the western United States. This species is a priority species in the Pacific Flyway and the Intermountain West Waterbird Conservation Plan (Ivey and Herziger 2006), and it is listed as a “sensitive” species in Oregon. A statewide crane pair survey in 2000 found 245 pairs on the Refuge, 21 percent of the Oregon population. An additional 78 pairs were recorded on the Silvies Floodplain (Ivey and Herziger 2001).

High numbers of colonial-nesting waterbirds have also been counted on the Refuge. The Refuge supports several colonial waterbird species identified as priority species in the Intermountain West Waterbird Conservation Plan (Ivey and Herziger 2006), including western and Clark’s grebes, American white pelicans, California gulls, and Forester’s terns. Comparing peak refuge counts of nesting waterbirds with population estimates for the Great Basin Bird Conservation Region, most colonial waterbird peak counts exceeded 10 percent of the regional population. Malheur Refuge supported 20,500 breeding white-faced ibises (35 percent of regional population in 1998); 7,782 breeding western and Clark’s grebes (50 percent of the regional population in 1983); 4090 breeding American white pelicans (15 percent of the regional population in 1988); and 1,730 breeding great egrets (77 percent of the regional population in 1983).

Shorebirds: Malheur Refuge supports several breeding and migrating shorebird species that are designated as high priority species in the Intermountain West Shorebird Plan. Priority breeding species include the snowy plover, long-billed curlew, American avocet, and black-necked stilt. Priority migrant species that are common at Malheur Refuge include the long-billed dowitcher, western and least sandpiper, and red-necked phalarope. Numbers of migrant shorebirds using the Refuge were estimated during the Malheur-Harney Basin Study from 1975-1984 (USFWS 1975-1984). Total shorebird numbers exceeded 20,000 during fall migration during most years, with a peak of over 41,000 in August 1975. Western sandpipers, long-billed dowitcher and Wilson’s phalaropes tend to be the most abundant migrant species using the Refuge, each with peaks exceeding 15,000 birds. The numbers of migrant shorebirds at the Refuge qualifies the area as a Regional Western Hemispheric Shorebird Reserve, although the Refuge has not been designated as such.

Landbirds: Oregon and Washington Partners in Flight identified priority landbird species in various habitats in the 2000 Columbia Plateau Bird Conservation Plan. Many of these priority species are found at Malheur Refuge. Malheur Refuge is known to support very high densities of nesting willow flycatchers and yellow warblers; both are priority riparian habitat associates. Other refuge priority riparian birds include Bullock’s orioles and yellow-breasted chats. The Refuge also supports the largest local population of bobolinks in the western U.S. (a wet meadow–dependent species). Other priority species found in the uplands on the Refuge include loggerhead shrike, sage sparrow, sage thrasher, black-throated sparrow, lark sparrow, and Brewer’s sparrow (all shrub-steppe dependent). The Refuge supports also burrowing owls, Swainson’s hawks, and ferruginous hawks (upland associates).

Key Questions for the CCP

- What are the trends in migratory and breeding bird populations over the last 20 years?
- What are the key factors affecting trends?
- What is the role that Malheur Refuge should assume in the larger region with respect to supporting migratory and breeding bird populations?

Invasive Species, Including Common Carp and Perennial Pepperweed

Common Carp: Common carp were apparent in refuge waters by the early 1950s. By the mid-1950s, carp were established in large numbers throughout the Refuge. Currently carp are found in Malheur, Mud, and Harney lakes; in refuge wetlands; and throughout large areas of the Silvies and Blitzen River systems. Carp compete directly with waterbirds for aquatic food. In addition, carp feed by disrupting the benthic environment, which causes water turbidity issues that further decrease the productivity of the aquatic environment. Decreases in habitat quality and productivity within lakes, ponds, and marshes have been observed since the introduction of carp into the system, where there has been an absence of effective population control.

Carp control methods have included drawdowns, rotenone, electroshocking, physical barriers, fish screens, traps, poison bait stations, and blasting. Rotenone can be very effective but has proven to be less than 100 percent effective. Any benefit is short-lived because all fish are not killed, the remaining fish have a high fecundity, and the interconnectedness of the waters in the Silvies River, Blitzen, and the Refuge's lakes provide a continual source of carp. Rotenone negatively affects native fishes, spotted frogs, and other wildlife.

Electroshocking has been very useful in controlling carp in dewatered ponds and canals, but like other methods of control, is not 100 percent effective. This treatment works well for small, specific areas.

The construction and/or repair of physical barriers have proven to be very effective in reducing carp impacts in wetlands. At Malheur Lake it will be necessary to consider barriers that do not degrade water quality and reduce connectivity (i.e., impede passage of native aquatic species).

Noxious/Invasive Plants: The Refuge has been involved in weed control efforts for decades. Field management strategies incorporated the repression of Canada thistle through cultural practices such as haying as early as the 1950s. By the 1970s, the use of chemicals was commonplace for Canada thistle, perennial pepperweed, poison hemlock, and Russian knapweed. Biological control was used for the first time in 1982 in an attempt to control thistle.

Since that time, the list of noxious weeds that require attention within the Refuge has continued to grow. Those species that are listed as noxious by Harney County and are chemically treated on an annual basis include diffuse and Russian knapweeds, perennial pepperweed, puncture vine, Scotch thistle, medusahead rye, and white top. Individual salt cedar are occasionally discovered within the Refuge adjacent to Malheur and Harney Lakes and are eradicated immediately. Other nuisance species that are subject to control measures include Russian olive, reed canarygrass, common and hybrid cattail, and common reed.

Weeds and invasive species in upland habitats include medusahead, which has invaded shrublands on the southernmost portion of the Refuge (approximately 30 acres). Perennial pepperweed, Russian knapweed, and other invasive species occupy a large percentage of lowland shrub communities. In addition to these, common reed, reed canarygrass, and other undesirable weeds are expanding in marshes.

Effective control of invasive species is an important issue to many in the public, judging from the number of comments received on this topic during scoping.

Key Questions for the CCP

- How could current management strategies be improved upon? Especially, what possible strategies could control carp in the lakes and rivers associated with the Refuge?
- What would the effects of any large-scale efforts be on habitats, wildlife, and other aquatic species?
- How does this issue interact with those pertaining to fish passage, wetland management, and the water delivery system?
- How can the management of water and emergent marsh and meadow habitats be modified to balance wildlife production goals while discouraging the encroachment of emergents and invasives such as reed canarygrass?
- Are more plant management options (such as prescribed grazing during the growing season) desirable as strategies for meeting desired structure and condition?

Habitat and Vegetation Management

Lacustrine (lakes) and Playa: Malheur Lake was once capable of annually producing over 100,000 ducks (Cornely 1982) and ranked as one of the most productive waterfowl areas in North America. The lake also once played a much more significant role in the Pacific Flyway for migratory birds. Fluctuating water supplies over time stimulated marsh productivity and provided a variety of habitats.

The negative impacts of common carp became noticeable in the early 1950s and the productivity of this system has been far from optimal since that time. As carp populations increase, submergent vegetation, aquatic invertebrates, and other food staples for waterfowl and other waterbirds began to decrease. (See previous issue discussion of invasive carp.)

The 30,000-acre Harney Lake RNA and the 1,555-acre Stinking Lake RNA were established in 1975. The Harney Lake RNA protects the alkali lakes and associated and unique vegetation and wildlife species; this RNA is mostly undisturbed, particularly in dune and hot springs areas. Important natural features of the Stinking Lake RNA include a variety of salt desert plain communities, a permanent cold spring, and an alkaline lake. Public entry into Malheur Refuge's RNAs is by Special Use Permit only and must be for scientific research purposes.

Compared to other Refuge habitats, the lakes are not heavily manipulated, except by upstream diversion in the major watersheds. Malheur Lake has remnants of a dike system built primarily to protect farmed areas from high water on the north-central portion of the lake and to hold more water in the center of the lake where the best marsh habitat was (Cole Island).

Palustrine Emergent (seasonally flooded wet meadows) and Dry Meadow: Seasonally wet meadows provide foraging, resting, and nesting habitat for a variety of waterbirds and waterfowl, such as the sandhill crane, white-faced ibis, cinnamon teal, mallard, and gadwall; shorebirds, such as the American avocet and black-necked stilt; and neotropical migrants, such as the bobolink. Meadows are optimally characterized by native grasses (e.g., spike bentgrass, American sloughgrass, Nevada bluegrass, creeping wildrye), sedges, rushes, and native forbs.

Meadows undergo a number of manipulations to ensure desired vegetation structure, including flood irrigation, prescribed fire, haying, and grazing. Generally, meadows are provided flood irrigation (inundations of 0 to 3 inches deep) annually, beginning in March and extending until July or August.

Other meadow treatments vary from year to year. The Refuge removes residual vegetation in treated meadows with prescribed fire, rake-bunch grazing, haying, and mowing to stimulate early season growth of meadow plant species and manage desirable levels of litter accumulation. Short, early growing vegetation provides high protein foods to support feeding, breeding, and brood-rearing ducks, cranes, geese, and shorebirds. Periodic removal of decadent litter has been demonstrated to enhance nesting conditions. Most meadow treatments require a period of drying, which can interfere with brood rearing for some species. Untreated (idle) meadows are allowed to rest with residual vegetation from the previous growing season left on-site. The residual vegetation provides escape and nesting cover for cranes, waterfowl, and waterbirds.

Managing plant species composition in meadows is difficult. Weeds, especially perennial pepperweed, are a serious problem, and are currently managed primarily with herbicides. Since some practices (hay and rake-bunch grazing) are currently implemented only after the growing season ends, they do not exert negative pressure on invasive species or encroaching native species. Some in the public continue to believe that grazing poses unacceptable threats to resources on National Wildlife Refuges, as evidenced by comments received during scoping. Some members of the public dislike the use of fences, believe that they cause harm to wildlife, and feel that they are not well maintained. Preliminary data from a pilot study involving selective, intensive grazing of perennial pepperweed by sheep on the Refuge have suggested that this could be an effective treatment option.

Some observers believe that refuge meadow habitats are experiencing serious encroachment from emergents such as cattail. Some units have been managed as idle with fairly constant hydrology due to a lack of interior fences or inability to fine-tune water placement. In some areas the plant community has shifted from grasses toward emergents, thus reducing habitat diversity. Reversing this trend has proven difficult.

Palustrine Emergent (seasonally flooded marsh associated with wet meadows): Marshes ideally provide emergent nesting cover and limited open-water feeding areas for waterfowl and marsh birds. This habitat is generally located adjacent to ponds and experiences shallower flooding depths. Water depths range from 6 inches to 3 feet and flooding typically occurs from late winter/early spring through July. Marshes are used by overwater nesters, such as sandhill crane, rails, and redheads; provide escape cover for waterfowl broods, particularly late-season nesters, such as gadwall, redhead, and grebes; and provide habitat for other species, such as amphibians. Water depths may range to 4 feet.

Open water areas should make up 20-40 percent of this habitat and host a diversity of submergent plant species such as sago pondweed. This is difficult to maintain. Cattail, an emergent, has a high tolerance of water level fluctuations and higher pH soils and forms large acreages in some places. Common strategies used on the Refuge to set back succession include flooding, drawdown, and mowing. Disking, herbicides, and prescribed fire also assist in achieving the desired ratio and in managing litter.

Emergent marsh management is closely linked with the management of adjacent meadows. It is often necessary to fully irrigate meadows in order to maintain desired pond levels, resulting in emergent encroachment into adjoining meadow systems.

Palustrine Open Water/Emergent (semipermanently flooded wetland impoundments): Ponds and associated vegetation are semipermanently flooded and provide food resources for brooding diving

and dabbling ducks and support sandhill crane roosting and nesting. Emergent plants provide nesting and escape cover for broods and molting adults.

Fire and herbicides are used to manage for the targeted emergent-to-open-water ratio of 50:50. Drawdowns and disking provide opportunities for growth of smartweed, other moist soil plant species, and submergents. Infrastructure improvements have assisted in carp control and water management. Carp removal is also critical, to enable submergent plants to grow in undisturbed substrates and nonturbid water. To eliminate carp, we often dry up ponds, but this is not a completely effective management tool, as carp have shown a tenacious resistance to eradication in these habitats. Infrastructure improvements have assisted in carp control and water management.

Maintaining pond water levels through summer can be difficult, particularly in the Blitzen River units because of insufficient water supply. Even where late summer diversions are feasible, they can result in reductions in flow that are unacceptable for native aquatic species. Dikes surrounding ponds support predators, such as raccoon and mink, which prey on young waterfowl, cranes, and other waterbirds. Larger impoundments tend to promote higher brood survival.

Uplands (salt desert scrub, sagebrush lowland, sagebrush steppe, and dunes): Upland habitats include sagebrush steppe, salt desert scrub, dune, and sagebrush lowland. They provide habitat for ground nesting migratory birds, landbirds, and a diverse variety of mammals. Observers have noted a decrease in native forbs and grasses throughout these habitat types, as well as western juniper encroachment in shrublands on the southwest side of the Blitzen Valley. However, juniper cutting is not supported by many in the public, as evidenced by comments received during scoping. Crested wheatgrass was seeded on the Refuge following wildfires in the 1970s and 1980s. While successful in preventing establishment of cheatgrass, crested wheatgrass has hindered the re-establishment of native shrub, grass, and forb species in most areas.

Cropland: The Refuge annually plants 70-100 acres of winter wheat, rye, oats, and spring barley, to support greater sandhill cranes during fall staging. Past Flyway plans stressed retaining cranes on the Refuge as late as possible to reduce mortality in California's Central Valley after migration. Planted grains complement wetland foods, especially after the ground freezes. Deer, pheasants, geese, and dabbling ducks also use croplands.

The dryland farming program encounters various operational issues such as controlling weeds, ensuring successful seed establishment, preventing soil compaction from equipment, and managing yield variability.

Key Questions for the CCP

- How much area should be maintained in each habitat type and what are the desired structures and plant compositions to best support the diversity of species using these habitats? What should the interspersions of these habitats be and at what scale should we achieve target conditions?
- Should the Refuge prioritize maintenance or restoration of some habitats over others? How would such prioritization play out, including consideration of broader issues such as invasive species, fisheries, water quality, climate change, and visitor experiences?
- What kinds of management tools should be used, and when, and where, considering effectiveness, efficiency, compatibility with refuge purposes, and minimizing negative consequences? What modifications should be made to current management tools?

- Is the Refuge currently meeting crane, duck, and waterbird production goals? What is our past record? What limiting factors may be preventing achievement of these goals?
- Considering the needs of priority wildlife species and groups, how should we balance habitat management practices (flood irrigation, haying and grazing, burning, herbicide application, predation management, etc.)? What kinds of timing considerations are necessary to prevent nesting season or migration conflicts, to work effectively with plant growing seasons, and to fit in with water rights, variable water supply, and other issues?
- To what extent can manipulated habitats in the Blitzen Valley and Double-O Unit be shifted to Malheur Lake? How would this change the habitat mix and management opportunities in these areas?
- What research opportunities should be pursued?

Riverine Condition: Hydrology, Geomorphology, Riparian Habitat, and Fisheries

The value of the Refuge's migratory bird habitat is currently dependent on the availability and management of water resources. Management of the Blitzen Valley and the Double-O units is critical for meeting the Refuge's purposes because of their high values to migratory birds. In these areas, there is sufficient water and infrastructure to provide the necessary habitats.

Hydrology: The Blitzen River begins on Steens Mountain and flows north through the Blitzen Valley into Malheur Lake, joined by other tributaries originating on Steens Mountain as it flows northward. A system of dikes, canals, drains, and water control structures was developed beginning in the late 1880s to facilitate grazing and farming. Between 1907 and 1913, 17.5 miles of the river were channelized and straightened. The Blitzen River was also diked and deepened and more than 50 miles of secondary river channels were excluded from riverine hydrology. Portions of this water distribution system still exist and are used to manage water in the Blitzen Valley. Additional dikes, canals, drains and water control structures were added between 1935 and 1942 by the Civilian Conservation Corps (CCC). The area represents the most intensively managed and most productive habitat on the entire Refuge. On the Double-O Unit, water comes from large springs along the southwest margin of the basin and from Silver Creek to the northwest. The Double-O springs have water control infrastructure adequate to provide approximately 6,000 acres of wetland and marsh habitat. Silver Creek provides irrigation to the remaining 3,000 acres of wet meadow habitat but is only available in years of above-normal water conditions.

Geomorphology: The Blitzen River has a variety of physical conditions including a deep, wide channel; limited willows; steep, bare banks; few deep holes; and minimal habitat complexity. Connectivity between the river and its floodplain is limited in many areas. This could be a function of anthropogenic factors, such as water withdrawals, channelization, substrate trapped behind upstream dams, flood management, and historic grazing practices. For many reaches of the Blitzen River and its tributaries, the predevelopment hydrology is not fully understood.

Riparian Habitat: The Refuge contains riparian habitat along the Blitzen River, its tributaries, ditches and canals, and remnant traces of previously active sloughs in the Blitzen Valley, as well as a few patches in the Double-O Unit. The south Blitzen Valley also supports extensive stands of willow associated with irrigated meadows, and these stands are very important for riparian landbirds. Smaller stands of willow are associated with wet meadows and seasonal wetlands in the north Blitzen Valley and the Double-O. Since major reductions in livestock grazing occurred during the 1970s, riparian habitats have increased and expanded, especially in the south Blitzen Valley. Although riparian development is hampered in many areas due to the floodplain isolation related to

geomorphologic factors described above, the condition of the Refuge's riparian habitat is generally good. There is much diversity in the plant communities along the Blitzen River, its tributaries, and the East Canal. In other portions of the Refuge, diverting water for irrigation or incision of stream banks has lowered the water table; this has prevented riparian species from re-establishing.

Various efforts, including fence enclosures, vegetation management, plantings, and in-stream weir placement, have been undertaken in the last decade on the Blitzen River and its tributaries. On Bridge and Mud creeks these efforts have markedly improved riparian and riparian habitats. The Blitzen River, however, is deeply incised and channelized in many areas and vegetative restoration has proved difficult. Weirs placed in the Blitzen River were intended to improve riparian habitats, but their overall effectiveness needs to be thoroughly evaluated.

Fisheries Habitat/In-stream Flows: The Refuge has an interim agreement with ODFW to maintain minimum in-stream flows for native fish and other aquatic species. The Refuge currently tries to maintain a minimum flow of approximately 25 cubic feet per second (cfs) in the Blitzen River.

The Refuge has a permit for a winter water right (October 1 through March 1), which designates bypass flows ranging from 43 cfs to 54 cfs depending upon the time of year. The Refuge and ODFW are nearing completion of a 1D Phabsim model that will provide an objective basis for year-round in-stream flow targets. The Refuge has pending transfers before the Oregon Water Resources Department to change the existing irrigation water rights to a different purpose—wildlife refuge management. This will provide significant flexibility in how, where, and when the Refuge could apply its water so that it is most beneficial for wildlife and habitat management.

In the Double-O Unit, the Refuge has senior irrigation water rights that are seldom served because of water availability and infrastructure issues. The large spring water resources of the Double-O Unit are effectively used for irrigation and pond management.

Denil-style fish ladders were installed on three dams on the Blitzen River in the late 1990s and at two in-line structures on canals. Studies by Anderson (2009) revealed substantial delays at the old ladders and denils. New fish passage and screening at the dams began to be addressed in 2010 through projects funded by the American Recovery and Reinvestment Act. Upgraded or new screening of diversions for fish began to take place in the late 1990s and continues as funding becomes available.

Water Quality: Refuge practices to manage water and migratory bird habitat have the potential to adversely impact water quality. Irrigation and water management on the Refuge may decrease in-stream flows, exacerbate high water temperatures, reduce dissolved oxygen concentration, increase turbidity, increase nutrient loading, and degrade fish habitat. Nutrients, fecal coliforms, and other pathogens may enter the Blitzen River via irrigation return flows, drawdowns, and overland flow, decreasing water quality.

The Blitzen River, Krumbo Creek, Bridge Creek and Canal, and Mud Creek currently are 303(d) listed with impaired water quality. Temperature is an impaired parameter for all of these segments and most others do not meet the regulatory standards for flow modification, sedimentation, pH, DO, and phosphate-phosphorus. Some of these water quality issues can only be addressed at a larger watershed scale, such as the Blitzen River, which is already impeded prior to flowing onto the Refuge by elevated water temperatures and low DO in the upper Blitzen River. At this point there is no total maximum daily load (TMDL) for the Blitzen system. In 2006, the Oregon Department of

Environmental Quality (ODEQ) specified a target date of 2010 for starting this TMDL. However, the current ODEQ website indicates that this has not occurred.

Best management practices (BMPs) currently underway to improve water quality include riparian plantings, fence enclosures for cattle, carp control in wetlands, and management of surface return flows when meadow and wetland habitats are being drained. Slower drawdowns in wetlands may reduce turbidity or surface return flows to the river; however, these increase salinity levels and temperature that can affect the biotic composition of meadows, marshes, and wetlands.

Key Questions for the CCP

- How should the Refuge work with cooperating agencies, neighbors, and regulators to implement the BMPs that will further address water quality issues?
- Is river and riparian management sufficient for sustaining or enhancing populations of priority fish species? How could the Refuge enhance its management of aquatic resources including native fishes?
- How should we approach riparian restoration on the Refuge? What are feasible strategies that complement site potential?
- How should the Refuge balance in-stream restoration of the upper Blitzen River with water management in Blitzen Valley?
- What role will climate change play in the future condition and management of these habitats? What parameters should be monitored and assessed?
- What role do the Refuge's water rights play in the management of these habitats?
- How much, if at all, has prior/current management altered this system (e.g., soil characteristics, gravel, sediment distribution, channel form, erosion rates, connectivity, riparian vegetation)? What assessments and tools are necessary to evaluate trade-offs among management strategies so that sustainable approaches for both aquatic and terrestrial habitats can be developed?
- Are life histories of priority aquatic species sufficiently understood to inform management decisions?
- What are the objectives for establishing in-stream flow targets, and what actions can be taken to determine whether attaining targets are having desired effects?

Water System Infrastructure and Delivery

The water delivery system operates by stacking water behind six dams on the Blitzen River. The water is diverted (mainly during spring and early summer) via canals, ditches, and feeder ditches to flood-irrigate a number of meadows and wetlands before returning to the Blitzen River as irrigation return flows, surface sheet flow, or subsurface percolation.

The existing flow-through delivery system is thought to mimic the natural flooding regime during peak flow events associated with spring runoff (mid-April through late May), but relies on an enormous system of ditches, water control structures, culverts, dikes, spreaders, and other structures the remainder of the year. Costs associated with maintaining this system are high.

Generally speaking, the system lacks the capacity to independently flood or draw down individual wetlands, marshes, or meadows. The irrigation system is only capable of managing fields at a gross scale (typically 1,000+ acres). The system's inefficiency and sheer size makes it difficult to maintain

desirable meadow and wetland water levels at key points in time for breeding waterfowl and sandhill cranes. For instance, keeping brood water in meadows until August for cranes requires the Refuge to divert a large volume of water during a low-flow period to keep ditches charged. Water infrastructure also limits site-specific habitat management efforts such as disking, mowing, haying, and invasive species control.

Ditches require clear passage to move water efficiently; however, riparian plants and beavers regularly create clogs in the system. Past ditch cleaning with an excavator has exacerbated the system's inefficiency by deepening delivery ditches. Chemical control of vegetation is expensive and raises concerns about effects on habitats.

Key Questions for the CCP

- What opportunities and constraints does the existing water delivery system provide for wildlife and habitat management? How can we improve its efficiency and increase our effectiveness in meeting desired habitat and population outcomes?
- Are more efficient or “river-friendly” water management practices complementary or in conflict with wildlife management objectives for marshes, ponds, and meadows? If there is tension between the two, how could this be resolved?
- What are the best methods for cleaning ditches from the standpoint of effectiveness, cost, and environmental health?
- What changes could be made to the water delivery system to improve water quality?
- Should the practice of removing woody vegetation along key water ways (dikes and canals) continue to maximize efficiency for water delivery?
- Would a water budget assist in guiding operation of the water delivery system and assist in evaluating management options?
- What tools exist (or are needed) to evaluate options to benefit both river and wildlife management objectives?

Preserving the Legacy of Human and Paleontological History at Malheur Refuge

Archaeological data indicate that humans have lived in and around Malheur Refuge for over 9,800 years. Although less than 30 percent of the Refuge has been formally surveyed, over 300 sites have been recorded on the Refuge and are widely distributed across the landscape. These sites include lithic scatters, summer villages, burials, rock shelters, winter villages, rock art, traditional cultural properties, hunting blinds, and vision quest sites. Two precontact sites have been listed on the National Register of Historic Places (NRHP) for their scientific value.

The modern descendants of the early inhabitants of the Refuge are members of the Burns Paiute Tribe. The precontact sites, as well as traditionally collected plants and animals, at Malheur Refuge continue to be important to the Tribe.

Three historic ranches (P Ranch, Sod House Ranch, and the Double-O Ranch), dating from the early Euro-American ranching and homesteading period, are also present on the Refuge and are listed on the NRHP. Historic sites that date back to the 1870s are generally located near reliable water sources or are associated with livestock grazing. A number of buildings and features constructed between 1935 and 1942 by the CCC are located on the Refuge and are eligible for listing on the NRHP. Four CCC-constructed lookout towers have been listed on the National Historic Lookout Register.

The paleontological resources at Malheur Refuge have not been investigated in detail. Camel vertebrae fossils have been found on the Refuge in Pleistocene (2.6 million to 11,700 years ago) volcanic ash deposits. Beyond this very little is known about the significance or educational potential of the site or others that the Refuge may contain. The Paleontological Resources Preservation Act (PRPA; [P.L. 111-011](#)) directs the Secretary of the Interior to manage and protect paleontological resources on Federal lands, including inventory, monitoring, and scientific and educational use of paleontological resources.

Because they are not renewable and are often subtle, fragile, and easily damaged, cultural and paleontological resources are quite vulnerable to weathering, destruction, degradation, or looting. The Refuge System's vision document, *Fulfilling the Promise*, illustrates that cultural resources are more than merely a legal responsibility. They represent a trust resource, a recreational destination, and perhaps most importantly, a tool for education and a mechanism for inspiring support for the Refuge System. A cross-section of the American experience is available at Malheur Refuge, from the first peoples subsisting on the same marsh and riverine resources of concern today, to the earliest pioneers, settling in a harsh and uncertain landscape. The legacy of the pioneering conservationists and the epic experiment in mass employment that was the CCC are also contained at the Refuge. These stories of the past enrich the visitor experience and support community pride. There is an opportunity to better understand and interpret lithic scatters, the role of rock art, the use of chert quarries, activities at winter villages, the evolution of hunting technology, and the overall use of the landscape around the Refuge.

Ground disturbance creates potential for impacts to cultural and paleontological resources. Habitat management tools, including flood irrigation, ditch maintenance, disking, prescribed fire, herbicide use, grazing, planting, and riverine restoration, can involve ground disturbance from access and movement of equipment in addition to the actual activity. Any of these activities has the potential to adversely impact such resources. When these resources have not been completely inventoried (as is the case at the Refuge), understanding adverse impacts is more difficult; knowing what is present is the first step in knowing what could be affected.

Recreational use of the Refuge can inadvertently hasten the demise of cultural or paleontological resources. Recreational use also creates opportunities for looters, especially in more remote areas.

A number of information or research needs related to cultural resource and paleontological management have been identified, including a field inventory in places sustaining or proposed for high public use; an inventory and assessment of stabilization and restoration needs for historic sites; a model identifying the sensitivity of various habitat types for the presence of cultural resources; a museum plan; and a paleontology inventory.

Key Questions for the CCP

- What sort of educational and interpretive messages and experiences should be provided, on-site or off-refuge, to provide residents and visitors the unique perspective of archaeology and history at Malheur Refuge?
- In the absence of a 100 percent inventory, which areas are likely to be most sensitive or contain the most significant precontact sites? Should recreational use in these areas be restricted? If not, which strategies would be most effective in preventing looting and destruction of cultural resources?

- What criteria should we establish to help us determine if a site is significant, and how should management activities adjust?
- How should we balance the continued administrative use of historic sites, including headquarters, dikes, roads, maintenance, and upgrades, with the historic features of the site?

Visitor Access, Facilities, and Information

Malheur Refuge receives visitors from across North America and the world. Nearly half of refuge visitors come from out of state. Nearly all visitors stay more than one day. Various independent groups organize regular trips to Malheur Refuge, especially during the spring. The Refuge is also a partner for the John Scharff Migratory Bird Festival each spring and is a stop for organized tours and independent visitors during the festival weekend. Malheur Refuge is a destination refuge, with attendant concerns, opportunities, and responsibilities.

A visitor center, staffed by trained volunteers, is located at Refuge Headquarters, and is open weekdays, as well as on the weekends during the spring, summer, and fall. Other visitor information is provided through the refuge website, local tourism information outlets and lodgings, directional and entry signs, and orientation maps and brochures at selected locations on the Refuge.

Currently access is mostly provided and promoted in the Blitzen Valley Unit. Public access to the Double-O Unit has not been encouraged or emphasized, although a gravel county road runs through the unit and the area is identified on refuge maps.

Up until the late 1980s, dike tops, management roads, and some other areas were open to public access outside of the breeding and nesting season. The Refuge's adoption of the concept of minimal disturbance in the 1990s resulted in restrictions in such access. Currently the public can use public roads, trails, and viewing facilities at any time of year, or areas specifically designated for fishing or hunting during those seasons. Occasionally, access into closed areas is made available to tour groups (such as during the John Scharff Migratory Bird Festival) with advance permission and Special Use Permits. Some members of the public have expressed the desire to have access more widely available on the Refuge, to provide a greater diversity of viewing experiences. There is concern from others that additional access may disturb wildlife or jeopardize the preservation of cultural resources.

Key Questions for the CCP

- Are marketing efforts and communications reaching current and potential visitors?
- Are brochures, signs, and maps clear and easily located throughout the Refuge's units? Do visitors understand when they are on Malheur Refuge?
- Should additional visitor access be provided in areas currently closed, for example, allowing access for wildlife observation and photography on or adjacent to Malheur Lake?
- Which aspects of previous facilities planning should be revived, implemented, and funded?
- What is the best way to regulate and manage the occasional use of the Refuge by commercial groups?
- Where and how should the Refuge provide additional access opportunities for people with disabilities?

Providing Quality Wildlife Observation, Photography, Interpretation and Environmental Education

Wildlife Observation and Photography: The most popular activity on the Refuge is wildlife observation and photography, especially in the spring and fall. Key sites are located in the Blitzen Valley, along the 42-mile auto tour route reaching from Refuge Headquarters, with its views of Malheur Lake, down to Page Springs and Frenchglen at the foot of Steens Mountain.

Birders are often quite interested in unusual or rare birds, especially passerines (perching birds or songbirds), which tend to congregate in areas with large trees and shrubby undergrowth. Malheur Refuge Headquarters and Benson Pond are favorite spots for such sightings and the appropriate vegetation management needed to draw in such species is of acute interest to many birders. Many scoping comments were received on this topic. Since some of the favored trees and shrubs used by these passerines are non-native or invasive, a decision should be made about where and how much of this kind of vegetation to maintain or promote.

In addition to the sites mentioned above, eight foot-trails are available on the Refuge, including a cross-state trail known as the Desert Trail. This trail is not maintained, and route layout and connections are poorly understood. Very few people use this trail for long-distance backpacking.

A Basin and Range “Birding Trail” has been proposed, to link the Refuge and other Great Basin birding sites. In concept, this type of trail will be supported by a map and make use of existing roads and facilities.

Environmental Education: The environmental education program at Malheur Refuge is a small staff- and volunteer-led program. At this time, no indoor facilities at Refuge Headquarters are available for this program. Limited transportation funds and staff time constrain program offerings. Environmental education activities are often focused on visitors and families participating in events such as the John Scharff Migratory Bird Festival, Free Fishing Day, and others.

Interpretation: Most of the Refuge’s interpretive stops are located along the Center Patrol Road, or Highway 205 (a State-designated Scenic Byway). Interpretative materials are also associated with historic sites and found at Refuge Headquarters. Interpretation emphasis has been on signs, brochures, and web information. On-refuge and off-refuge presentations for Malheur Refuge are limited.

A number of previous planning efforts (some interagency) identified interpretative needs and proposed various facilities on and around the Refuge. Lack of funding has limited implementation of these plans. It is important to review the good ideas and the barriers to implementing these interpretive ideas, as well as considering new venues that incorporate technology into the interpretive experience.

Key Questions for the CCP

- Do current facilities, programs, and habitat management practices adequately support quality experiences in wildlife observation, photography, interpretation, and environmental education, and are they compatible with refuge purposes? In what ways can these programs be more effective?

- Are current trail offerings sufficient? Is maintaining the Desert Trail in alignment with other refuge objectives?
- What audiences should program offerings and facilities efforts be focused on? Novices? Advanced birders? Local students? Age groups? What balance of on- and off-site programming is desirable?
- How should the Refuge use partnerships to leverage and extend limited resources in these programs?
- What opportunities are available to directly connect children with nature?
- What additional visitor facilities should be developed, if any?
- In what ways can the Refuge improve its communication and coordination with visiting wildlife viewing groups at Malheur Refuge and with other partners?
- Are key messages supported by interpretive offerings and educational curricula? What are the perceptions and take home messages absorbed by new visitors, repeat visitors, and tour participants?

Providing Quality Fishing and Hunting Opportunities

Hunting: An estimated 1,400 hunters recreate on the Refuge each year. Hunting is the only “dispersed” recreational use on the Refuge, where hunters are permitted to wander cross-country within designated hunting units. The main issues identified with the hunting program include lack of opportunity, road access, and regulatory consistency.

Waterfowl hunting is provided on the north side of Malheur Lake, but hunting success and participation have declined sharply since carp became established in the lake. Access to this unit varies significantly from year to year due to fluctuating water levels.

Pheasant hunting occurs in the Buena Vista Unit and is a popular opportunity, partly due to the fact that off-refuge pheasant hunting opportunities are limited in the surrounding area. Special regulations are in effect in the unit to reduce conflicts with greater sandhill cranes during fall staging.

Hunters may take a wide variety of game in the Boundary Hunt Unit, including waterfowl, upland game, big game, coyotes, etc. The hunt unit covers the narrow western border of the Refuge west of Highway 205 and south of Foster Flat Road, and includes some land southeast of Krumbo Reservoir. The refuge boundary is not well marked along its shared boundary with BLM and follows rimrock in many areas; hence, this hunt unit is managed consistent with regulations used on BLM lands. The hunt is primitive with no designated facilities. Above Krumbo Reservoir, access is gained from Diamond Lane at Moon Hill Road and the condition of the road is poor.

Fishing: Two separate fishing areas are open for fishing opportunities on the Refuge: Krumbo Reservoir and the south fishing loop, which encompasses a portion of the Blitzen River, the East Canal, and Bridge and Mud creeks.

Krumbo Reservoir was originally developed as a water storage area. Warm water fish, including crappie and large-mouthed bass were introduced several decades ago; large-mouthed bass remain, but are not actively managed for. Non-native rainbow trout have been stocked for many decades. ODFW stocks the reservoir annually with sterile rainbow trout. This program is technically out of compliance with Service policy, which prohibits stocking of non-native species. A small population of non-sterile rainbow trout that remains from historic plantings spawns in Krumbo Creek.

The reservoir provides a reliable fishing opportunity in Harney County and is very popular with local residents. Bank and boat fishing (with nonmotorized boats or electric motors) are allowed. The reservoir and adjacent lands are closed to all public access outside of the designated fishing season to minimize wildlife conflicts.

The south fishing loop is open year-round for a native redband trout fishery. Special regulations are in effect in this area. This area is a popular fly fishing area with local residents and out-of-area anglers.

East Canal, part of the south loop, is a popular fishing area. East Canal was formerly open for vehicular access. It was changed to hike-in only access in the late 1990s, which some members of the public believe unnecessarily restricts access.

Carp have successfully established in the river and canal system and have severely reduced and impacted the aquatic habitat. The redband trout fishery may directly benefit from Refuge efforts to control carp populations.

Key Questions for the CCP

- Does the current array of hunting and fishing opportunities meet demand from a diverse set of consumptive recreationists and provide high-quality experiences, compatible with Refuge purposes?
- Is there a need for additional waterfowl, big game, upland game, or non-game (i.e., coyote) hunting areas?
- Are restrictions to avoid conflicts with natural and cultural resources adequate?
- How can access concerns and problems be best dealt with?
- Is transitioning from a stocked non-native rainbow fishery to a stocked redband fishery in Krumbo Reservoir a reasonable alternative to consider in the CCP?
- What modifications to the program might improve fishery or game populations and improve the experience for visitors?
- Is the use of live bait a concern?
- Should a recreational carp fishery be provided? Are there opportunities for recreational carp fishing outside the south fishing loop?
- Are native redband trout present in Krumbo Creek? If so, could the population establish a fishery in the reservoir?
- Is there evidence that fertile non-native rainbow trout in Krumbo Reservoir are affecting redband trout in the Blitzen River basin?

Wilderness

Harney Lake was previously recommended for wilderness designation, but the recommendation was neither completed nor terminated. All refuges undertake new wilderness reviews as a part of the CCP process.

Key Questions for the CCP

- Which areas qualify as wilderness study areas? How would management and use of any potentially eligible refuge areas be affected by wilderness designation?

Collaboration

Involving the public in major refuge decisions and working successfully with partners to increase effectiveness have been recent emphases for the Refuge. Several resource issues, such as effective control of invasive or habitat restoration, cannot be effectively addressed without awareness of and attention to landscape level conditions. Refuge actions in the areas of habitat management and water rights are other areas where larger communities are affected. The need for collaboration and outreach has been a message the Refuge has consistently received from diverse interests both prior to and during scoping. The Refuge has a need to ensure that key stakeholders understand, support, and are involved in a meaningful and productive manner throughout the planning process.

Effective collaboration creates an opportunity for the Refuge to engage the diverse public in constructive dialogue that seeks agreement on key issues. This process will enhance relationships between the Refuge and stakeholders and among the stakeholders themselves. These relationships will enable the Refuge to address challenges in a more efficient and comprehensive manner.

1.9.3 Issues outside the Scope of the CCP

The following issues were raised by the public and not addressed in the CCP:

- The need for pullouts for bird watchers along State and County roads.
- Issues related to the placement of transmission lines over or adjacent to the Refuge in conjunction with the development of alternative power projects on Steens Mountain (see http://www.blm.gov/or/districts/burns/plans/steen_trans/index.php).
- Use of the Silvies River floodplain for agricultural purposes and without an emphasis on wildlife uses.

1.10 Refuge Vision and Goals

1.10.1 Refuge Vision

Together with our surrounding community, partners, friends, staff, and all those who cherish this unique place where desert and water meet:

Malheur National Wildlife Refuge commits to care for, conserve, and enhance the health of the Malheur Lake, Blitzen Valley, and Double-O units, including the playas, dunes, marshes, rivers, meadows, and ponds that are all part of this landscape.

We will observe nature and manage in harmony with ecological forces, while recognizing and maintaining the Refuge as a key anchor for migratory and breeding waterfowl, waterbirds, shorebirds, songbirds, and raptors.

We will work diligently to improve the health of the land and water, reducing the destructive impact of carp and other invasive species, addressing imbalances in floodplain function, and restoring the original abundance of fish and wildlife for which Malheur Refuge is famous.

We will celebrate and welcome our visitors, noting and protecting the features that draw people again and again—the expansive landscape, the plenitude and diversity of wildlife, and the signs of a timeless history.

We will allow and enhance opportunities to experience abundance, solitude, and renewal, for people birding, fishing, hunting, and learning on the Refuge. In respect to our ancestors and their fortitude, we will carefully preserve the legacies they left behind on this land.

Collaboration with our neighbors, partners, and friends will be a critical cornerstone in our day-to-day work; we recognize that nature crosses boundaries and we can be successful only in partnership. We recognize that our activities are inextricably linked to the health of the local economy. We commit to environmental stewardship and sustainable management. We commit to learn from our efforts, successes, and failures; to be humble about what we know; and to continuously strive for greater understanding in our stewardship of this remarkable place.

1.10.2 Refuge Goals

The Service defines a goal as a “descriptive, open-ended, and often broad statement of desired future conditions that conveys a purpose, but does not define measurable units” ([602 FW 1](#)). Refuge goals are a means to achieving refuge purposes. Goals translate into one or more objectives that define these conditions in measurable terms. A well-written goal directs work toward achieving a refuge’s vision and ultimately, the purposes of a refuge. Collectively, a set of goals is a framework within which to make decisions. This CCP defines 14 goals for the Malheur Refuge.

GOAL 1. Enhance aquatic health and habitat conditions essential to the conservation of the flora and fauna that depend on Malheur Lake and associated water bodies.

GOAL 2. Protect, maintain, and rehabilitate riverine and riparian habitats to conditions essential for the conservation of native fish and wildlife species.

GOAL 3. Protect, maintain, and rehabilitate riparian habitats to conditions essential for the conservation of wildlife species.

GOAL 4. Enhance, protect, and/or maintain primary habitats essential to the conservation of a diversity of aquatic and terrestrial wildlife species.

GOAL 5. Enhance and maintain rare and unique habitats.

GOAL 6. Welcome visitors and offer them a safe experience of the Refuge’s outstanding features: diversity of wildlife, signs of earlier inhabitants, scenic landscapes, and solitude. As a result, visitors will leave the Refuge with a memorable experience that fosters a connection between themselves and nature and with an appreciation of Malheur Refuge’s unique resources.

GOAL 7. Connect the hearts and minds of visitors with the places and resources the Refuge protects, and enlighten visitors’ experiences with an understanding of, appreciation for, and knowledge about historic and natural resources, and the importance of conservation and stewardship.

GOAL 8. Provide reasonable challenges and opportunities, and provide uncrowded conditions for the hunting and fishing public.

GOAL 9. Initiate and nurture relationships to build support for the Refuge, and fortify refuge programs and activities to achieve the Refuge's purpose and goals.

GOAL 10. Manage prehistoric and historic cultural resources for their educational, scientific, and cultural values for the benefit of present and future generations of refuge users and for the communities that are connected to these resources.

GOAL 11. Identify and protect prehistoric and historic resources on the Refuge that are eligible for or listed on the National Register of Historic Places.

GOAL 12. Manage the Refuge's paleontological resources for their educational and scientific values for the benefit of present and future generations of refuge users.

GOAL 13. Gather scientific information (surveys, research, and assessments) to support adaptive management decisions.

GOAL 14. Integrate our conservation-based mission with the best available science and become a leader in advancing best practices for the design and management of innovative, sustainable refuge and community development opportunities.

1.11 References

- Altman, B. and A. Holmes. 2000. Conservation strategy for landbirds in the Columbia Plateau of eastern Oregon and Washington. Oregon-Washington Partners in Flight. The Plains, VA: American Bird Conservancy. 131 pp.
- Audubon. 2011. Important bird areas. Available at: <http://www.audubon.org/bird/iba>. Accessed 2011.
- Castineira, W. 2010. Personal communication between Wendy Castineira and Sharon Selvaggio, Planner, USFWS Region 1.
- Copeland, W.N. 1979. Harney Lake Research Natural Area. Suppl. 9. [Supplement to Federal Research Natural Areas in Oregon and Washington: a guidebook for scientists and educators.] U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. Portland, OR. 21 pp.
- Copeland, W.N. and S.E. Greene. 1982. Stinking Lake Research Natural Area. Suppl. 12. [Supplement to: Federal Research Natural Areas in Oregon and Washington: a guidebook for scientists and educators.] U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. Portland, OR. 21 pp.
- Cornely, J.E. 1982. Waterfowl production at Malheur National Wildlife Refuge, 1942-1980. Transactions of the North American Wildlife and Natural Resources Conference 47:559-571.
- David, J. and G. Ivey. 1995. Double-O habitat management plan. Malheur National Wildlife Refuge. U.S. Fish and Wildlife Service. Princeton, OR. 88 pp.
- Ivey, G.L. 2000. Closed-Basin Plan. Jt. Venture implementation plans for habitat conservation areas in eastern Oregon. Oregon Wetlands Joint Venture, Portland.
- Ivey, G. L. and C. P. Herziger. 2000. Distribution of greater sandhill crane pairs in Oregon, 1999/2000. Oregon Department of Fish and Wildlife Nongame Technical Report #03-01-00. Portland, OR.
- Ivey, G.L. and C.P. Herziger, compilers. 2006. Intermountain West waterbird conservation plan. Version 1.2. U.S. Fish and Wildlife Service Pacific Region. Portland, OR. 205 pp.

- Langston, Nancy. 2003. Where land and water meet: a western landscape transformed. University of Washington Press: Seattle, Washington.
- Merriam-Webster. 2011. Issue. Available at: <http://www.merriam-webster.com/dictionary/issue>. Accessed May 8, 2011.
- Miller, M.R., J.Y. Takekawa, D.S. Battaglia, R.T. Golightly, and W.M. Perry. 2010. Spring migration and summer destinations of northern pintails from the coast of Southern California. *Southwestern Naturalist*, 55(4):501-509.
- North American Waterfowl Management Plan, Plan Committee. 2004. North American waterfowl management plan 2004. Strategic guidance: strengthening the biological foundation. Canadian Wildlife Service, U.S. Fish and Wildlife Service, Secretaria de Medio Ambiente y Recursos Naturales. 22 pp.
- ODFW (Oregon Department of Fish and Wildlife). 2006. Oregon conservation strategy. Oregon Department of Fish and Wildlife, Salem, Oregon.
- Oregon Habitat Joint Venture. 2005. Coordinated implementation plan for bird conservation in eastern Oregon. Eastern Oregon Working Group. 43 pp.
- Oring, L.W., L. Neel and K.E. Oring. 2000. Intermountain West Regional Shorebird Plan. Version 1.0. 55 pp. Available at: <http://www.fws.gov/shorebirdplan/RegionalShorebird/downloads/IMWEST4.Doc>.
- Pacific Flyway Council. 2006. Pacific Flyway management plan for the Wrangel Island population of lesser snow geese. White Goose Subcommittee, Pacific Flyway Study Committee [c/o USFWS], Portland, OR. Unpublished report. 20 pp.+ appendices. Available at: http://www.dfw.state.or.us/wildlife/OGCTF/docs/Wilsg_plan.pdf.
- Pacific Flyway Study Committee. 2002. Pacific Flyway Implementation Plan for the Rocky Mountain population of Trumpeter Swans. Prepared for the Pacific Flyway Council and U.S. Fish and Wildlife Service. 28 pp. Available at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/FocalSpecies/Plans/Trumpeter%20Swan%20Plan.pdf>.
- Subcommittee on Pacific Population of Western Canada Geese. 2000. Pacific Flyway Management Plan for the Pacific Population of Western Canada Geese. Pacific Flyway Study Committee, (c/o USFWS, MBMO). Portland, OR. Unpublished report. Available at: http://pacificflyway.gov/Documents/Pwcg_plan.pdf.
- Sharp, D.L. 1914. Where rolls the Oregon. Boston: Houghton Mifflin.
- USFWS (U.S. Fish and Wildlife Service). USFWS. 1975-1984. Malheur-Harney Basin Study from 1975-1984. Unpublished report. On file, Malheur Refuge.
- USFWS. 1985. Malheur National Wildlife Refuge master plan and environmental assessment. USFWS, Region 1. Portland, OR. 133 pp. On file, Malheur Refuge.
- USFWS. 1990. Blitzen Valley Management Plan, Malheur National Wildlife Refuge, Oregon. Princeton, OR. 169 pp. On file, Malheur Refuge.
- USFWS. 1995. Double-O habitat management plan, Malheur National Wildlife Refuge, Oregon. Princeton, OR. 88 pp. On file, Malheur Refuge.
- USFWS. 2008. Birds of conservation concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management. Arlington, VA. 85 pp. Available at: <http://www.fws.gov/migratorybirds/NewReportsPublications/SpecialTopics/BCC2008/BCC2008.pdf>.
- USFWS. 2011. Realty records. On file, USFWS Region 1, Realty, Portland, OR.